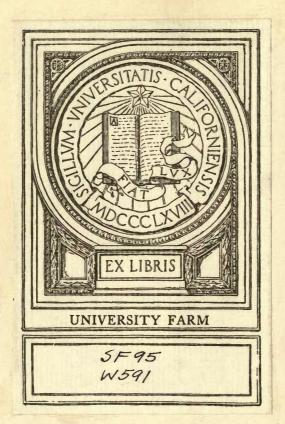
5F 95 W591

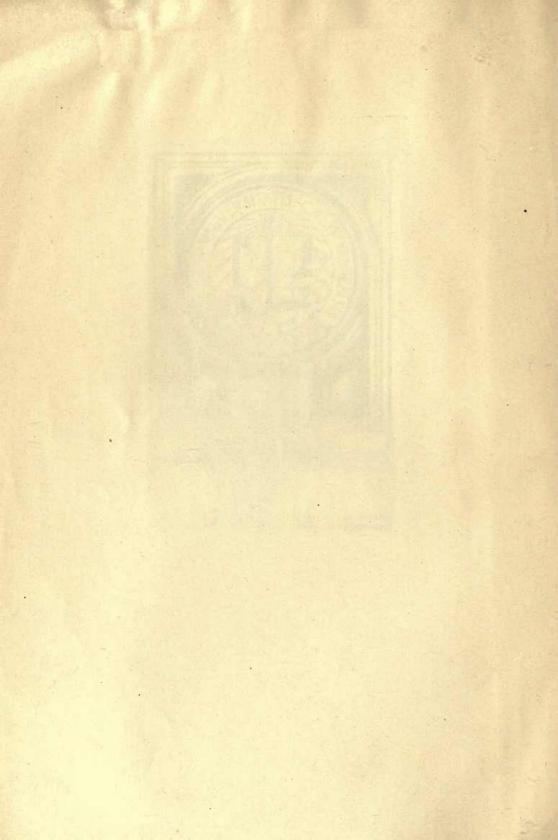


FEED MANUAL AND NOTE BOOK

F.W. WOLL, Ph.D.



DEED MANUAL AND NOTE BOOK



FARM MANUALS

FEED MANUAL AND NOTE BOOK

LIPPINCOTT'S FARM MANUALS

Edited by K. C. DAVIS, Ph.D.

SECOND EDITION REVISED

PRODUCTIVE SWINE HUSBANDRY By GEORGE E. DAY, B.S.A.

PROF. OF ANIMAL HUSBANDRY, ONTARIO AGRICULTURAL COLLEGE, CANADA. 96 illustrations. xiii + 363 pages. \$1.75 net.

PRODUCTIVE POULTRY HUSBANDRY

By HARRY R. LEWIS, B.S.
POULTRY HUSBANDRYMAN, NEW JERSEY AGRICULTURAL
EXPERIMENT STATION.

330 illustrations.

xxi + 536 pages. \$2.00 net.

PRODUCTIVE HORSE HUSBANDRY

By CARL W. GAY, B.S.A.
PROF. ANIMAL HUSBANDRY, CHAIRMAN ANIMAL HUSBANDRY SECTION,
DEPARTMENT OF AGRICULTURE,
UNIVERSITY OF MINNESOTA:

176 illustrations.

xvi + 331 pages.

\$1.75 net.

PRODUCTIVE ORCHARDING

By FRED C. SEARS, M.S.

PROF. OF POMOLOGY, MASSACHUSETTS ACRICULTURAL COLLEGE.

157 illustrations. xiv + 314 pages. \$1.75 net.

PRODUCTIVE VEGETABLE GROWING By JOHN W. LLOYD, M.S.A.

PROF. OF OLERICULTURE, UNIVERSITY OF ILLINOIS.

194 illustrations. xiii + 339 pages. \$1.75 net.

PRODUCTIVE FEEDING OF FARM ANIMALS By F. W. WOLL, Ph.D.

PROF. OF ANIMAL NUTRITION, UNIVERSITY OF CALIFORNIA. 106 illustrations. xii + 375 pages. \$1.75 net.

COMMON DISEASES OF FARM ANIMALS

By R. A. CRAIG, D.V.M.

PROF. VETERINARY SCIENCE, PURDUE UNIVERSITY.

124 illustrations. xii + 334 pages. \$1.75 net.

PRODUCTIVE FARM CROPS By E. G. MONTGOMERY, M.A.

PROF. OF FARM CROPS, CORNELL UNIVERSITY.

204 illustrations. xix + 501 pages. \$1.75 net.

PRODUCTIVE BEE KEEPING

By FRANK C. PELLETT STATE APIARIST OF IOWA.

135 illustrations.

xiv + 302 pages.

\$1.75 net.

PRODUCTIVE DAIRYING By R. M. WASHBURN

PROF. OF DAIRY HUSBANDRY, UNIVERSITY OF MINNESOTA. 132 illustrations. xii + 393 pages. \$1.75 net.

FEED MANUAL AND NOTE BOOK

PREPARED BY

F. W. WOLL, Ph.D.

PROFESSOR OF ANIMAL NUTRITION, UNIVERSITY OF CALIFORNIA



PHILADELPHIA AND LONDON J. B. LIPPINCOTT COMPANY

FEED MANUAL AND NOTE BOOK

or principles supering and the

COPYRIGHT, 1917 By J. B. LIPPINCOTT COMPANY

> U. OF C. LIBRARY

Electrotyped and Printed by J. B. Lippincott Company The Washington Square Press, Philadelphia, U. S. A.

PREFACE

This Manual has been prepared with two main objects in view: first, to enable students in agricultural schools and colleges to become thoroughly familiar with our more important feed materials, not only as regards their chemical composition and digestibility, but as to appearance, physical properties, and the various conditions that influence their value for stock feeding; and second, to furnish a guide for the use of the feeds in compounding rations that is both scientifically correct and sound from a practical point of view. The aim has been to stimulate independent thinking so that the facts and principles brought out may form a part of the mental equipment of the student that will materially aid him in his later efforts to become a successful stockman.

The plan of the exercises has purposely been made somewhat flexible, for the benefit of teacher and student alike, since local conditions in different sections and states vary greatly, both as to kinds and cost of the available feeding stuffs, and the feeding practices followed; hence, such special problems as are of more direct value in a particular section may be given the preference. The object of the simple tests given in the Manual is to acquaint the student with some of the common impurities or adulterations of feeding stuffs, which may be readily determined in the classroom without any special equipment beyond a few common inexpensive pieces of apparatus. The microscopic identification of components of feeding stuffs, condiments, etc., has not been attempted, since this requires special training in microscopic technique and a knowledge of the anatomy of plant tissues, as well as laboratory facilities, that may not be available for students taking a course in feeding.

The Manual is based primarily on the author's book, "Productive Feeding of Farm Animals," but it can also be readily used in connection with other text or reference books on this subject. The solution of many of the problems given cannot, however, be found by referring to any one book. The literature on the subject, especially the publications of the various Experi-

¹J. B. Lippincott Company, Publishers, Philadelphia, Penn., Revised Edition, 1916, 385 pp.

PREFACE

ment Stations or the United States Department of Agriculture, must often be consulted, and in some cases, knowledge drawn from practical feeding experience. It will be found that the interest of the student in the subject will be quickened by this method of instruction, and that it will better prepare him to grapple with the feed problems of the farm later on that will present themselves, than if he were merely required to go through some problems of arithmetic relating to the feeding of stock, however valuable these may be.

I am all a very the most spirit value in a representation around the given by the little and it

February, 1917

CONTENTS

Introduction	PAGE
Instructions for Filling Out Feed Blanks	
	11
A. FEEDING STUFFS:	
Francisco	100
1. Green Alfalfa	13
2. A STUDY OF DIFFERENT KINDS OF HAY	15
3. Timothy Hay	16
4. Meadow Hay	18
5. CLOVER HAY	20
6. To CALCULATE THE AMOUNT OF HAY IN A MOW	22
7. To Calculate the Amount of Hay in a Stack	23
8. Oat Straw	24
9. Corn Silage	26
10. To Calculate the Amount of Silage in Silos	28
11. The Silo on the Stock Farm	29
12. A STUDY OF MARKET PRICES OF FEEDING STUFFS	31
13. Preliminary Study of Concentrated Feeds	33
14. Tests for Adulterations of Concentrates	35
15. Indian Corn	36
16. CORN-AND-COB MEAL	38
17. To Measure Corn in Cribs	39
18. Oats	40
19. To Determine Per Cent of Hulls in Oats	41
20. CORN AND OATS ("GROUND FEED")	42
21. Barley	43
22. Milo Maize	44
23. Grain Screenings	45
24. WHEAT BRAN	46
25. WHEAT MIDDLINGS	48
26. Red Dog Flour	50
27. BUCKWHEAT FEED	51
28. To Determine Per Cent of Hulls in Buckwheat Feed and in Rice Feeds	52
29. GLUTEN FEED	53
30. DRIED BEET PULP	54
31. Test of Water Absorption by Dried Beet Pulp	55
32. Dried Brewers' Grains	56
33. DRIED DISTILLERS' GRAINS	58
34. LINSEED MEAL	60
35. THE SWELLING TEST FOR LINSEED MEAL	62
36. COTTONSEED MEAL	63

CONTENTS

37. Test for Impurities in Cottonseed Meal	
38. Coconut Meal	
39. Tankage	
40. MIXED DAIRY FEEDS, MISCELLANEOUS FEEDS, ETC	
41. CONDIMENTAL STOCK FEEDS	74
42. The Feed-Unit System	75
43. Comparisons of Relative Economy of Feeding Stuffs	77
44. Comparative Manurial Values of Feeds	79
45. A STUDY OF FARM FERTILITY	81
B. Rations for Farm Animals:	
Exercise	PAGE
46. Problems in Calf Raising	82
47. THE WOLFF-LEHMANN STANDARD FOR DAIRY COWS	
48. The Armsby Standard for Dairy Cows	86
49. The Haecker Standard for Dairy Cows	
50. A Study of Rations for Dairy Cows	
51-55. Formulating Rations for Dairy Cows	90
56. Criticisms of Rations for Dairy Cows	98
57. Rations for Cows on Official Tests	
58-59. Relative Economy of Dairy Feeds	101
60. A STUDY OF HERD MANAGEMENT	
61. FEEDING DIFFERENT-SIZED DAIRY HERDS	
62. Soiling Crops for Dairy Cows	
63. Value of Alfalfa Pasture	
64. Comparison of Feeds for Fattening Steers	
65-66. Rations for Fattening Steers.	
67. Problems in Steer Feeding.	
68-71. A Study of Rations for Horses.	
72. Rations for Colts, Mares and Work Horses	
73. A Problem in Horse Raising.	
74-75. Rations for Fattening Pigs	
76. Feeding Market Pigs.	
77. A RATION FOR BROOD SOWS WITH LITTERS	
78. A Problem in Pig Feeding	
79. A STUDY OF RATIONS FOR GROWING SHEEP.	
80. Rations for Fattening Lambs.	
81. A Study of Poultry Feeds	
82. A STUDY OF POULTRY RATIONS	
DIGESTION COEFFICIENTS OF COMMON FEEDING STUFFS	
LIST OF APPARATUS FOR MAKING TESTS FOR IMPURITIES IN FEEDS	137

INTRODUCTION

THE Manual is divided into two parts:

I. Exercises relating to the value of common feeding stuffs used by American stockmen, their chemical composition and digestibility, methods of preparation, examination for purity, relative feeding values, etc.

II. Exercises illustrating calculations of rations for farm animals, the right and wrong uses of the various feeds for feeding cattle, horses, sheep, swine, and poultry, and general problems connected with the feeding of farm

stock.

The plan of the exercises follows in general that of the author's "Productive Feeding of Farm Animals"; references in the case of individual exercises are given to the chapters in which the necessary information may be found. In many cases, references given under the literature of the subject at the close of each chapter or in footnotes must be consulted. A number of tests for common impurities and adulterations of feeding stuffs are included in the exercises. These call for some simple inexpensive apparatus, a list of which is given at the back of the book. A standard collection of weed seeds will be found very useful in identifying weed seeds in mixed feeds, grain screenings, etc.

INTRODUCTION

surroy car etar bobivilo si lamaila au l

I transpose relating to the value of company facility and an expension stackards, their chemical composition and expenditure, cordinate of preparation, examination for purely, relative to the characteristics.

And a second of the state of the same second of the same of the same and the same of the same of the same second of the same o

I'm plan of the exercises follows in general that of the artiture when signifies Feeding of Ferm Arimals, a rederences in the recent of individual consequences are given to the encapters in which the uses same information may be found. In many cases, references given ender the transfers of the object of the case of each chapter or in foodnetse must be recently at the object of the case of each chapter or in foodnetse must be recently at a rancher in the common importures and adulterations of feeding study or included matthe extremes. These call for some simple mexicalization of grain of which is given at the book of the book. A atmospringlighted on a west grain, will be found very market in identifying word weeks in maked west grain.

INSTRUCTIONS FOR FILLING OUT FEED BLANKS

Origin.—Give name of locality where grown, or name of manufacturer or feed dealer; in the case of by-products and manufactured feeds, also source and method of manufacture.

Guarantees.—Copy these from the sack or package in which the feed is sold.

Quality.—Factors having a bearing on the quality of the feed are given here: proportionate parts of coarse and fine materials, leaves or stems, flavor, freedom from mustiness or molds.

Value for Feeding Farm Animals.—Designate by a word or two, giving important detailed information of the value for special animals at bottom of page under General Remarks, or on back of page. Information as to the value and characteristic properties of the various feeding stuffs will be found under the discussions of the feeds, Productive Feeding, Chapters XII to XX, or in the chapters discussing the feeding of the respective farm animals (Chapters XXI to XXVI).

Chemical Composition.—Average composition: copy from Productive Feeding, Appendix Table I.

Digestion Coefficients.—Copy from the Table near the back of this Manual. Per Cent Digestible Components.—Obtained by multiplying the per cent of the various components by the respective digestion coefficients given. Differences between the percentages of digestible components thus obtained and the corresponding figures in the last two columns of Productive Feeding, Appendix Table I, that may occur, are of minor importance, in view of the natural variations in the digestibility of the same feeds.

Carbohydrates.—Include nitrogen-free extract and fiber.

Digestible Carbohydrates and Fat.—Equal the sum of digestible carbohydrates and digestible fat, multiplied by 2.25.

Total Digestible Matter.—Equals digestible protein + digestible carbohydrates + digestible fat \times 2.25.

Cost Per Ton and Per Pound.—Give retail price at feed store or as billed. Weight Per Sack or Per Quart.—Determine the latter by weighing, if practicable; if not, use Appendix Table VI in Productive Feeding; for legal weights of grain, seeds, etc., see the author's "Handbook for Farmers and Dairymen," 6th Edition, page 400.

General Remarks.—Give general importance as a stock feed, special value or limitations as a feed for any class of farm animals, points affecting the value of the feed one way or the other, palatability, flavor, content of certain

aromatic or bitter principles, effect on bowels, etc.

DARKED CHICAGO FOR THE SANDERS OF SERVING

went of the called the called the special manuscript of the state of the special points of the special property of the special

Commission Copy these from the sach or produce in solicit, the good in

Blos

Courts to the test of course and the quality of the test are driver best of course of course and the name of the test of course and the name of the test of the te

important detailed information of the value for spread promise into about our majorant detailed information of the value for spread promises it information at the freeze of the calcium fosting stights will be bound under the discussions of the freeze Production because of human XII to XX. We in the chapter discussion the freeze of the f

A tempolita Avetage composition from Positions I reductive

Discollar Coefficient - Copy uson the Pales near the tales of this Manually

The curious compounds for the regardies dignotion of fracture grade, the first time of fractures from the compounds for the regardies dignotion of fractures produced and for corresponding theorem, in the last two common of fractures for the first time common of fractures for the dignostic forms of the fractures of the fractures of the dignostic forms of the fractures of the fra

with Sira to tree spectaregreein already - astrologicaling

c. Digestible Corkshydenies and Ret.—Equal the stan of digestible curve.

hydrates and digestible for, multiplied by 21%;

Your Deposition Matter Square sugarifies protein a significant states

Cost For This and Per Pound - Circs await passe at lord stone or to which

Weight For Such or For Quart - Determine Chroshytes by nothing if gratheshie; if not, use Appendix Table VI in Rush stay, Aveling for again weights of grain, week, i.e., see the nutbur's "Hamalouis for Parames and Distribute. Stir Valuon, page 106.

General Records — Chris general importance is a time leads at internal or include the character of the large class of time according to a second college of the other act of the other according to the according to the college of the large college of the large of the lead of the large of the lead of the large of the l

A. FEEDING STUFFS

EXERCISE 1. GREEN ALFALFA

Fill out the ductive Feeding			below	for the	feed	given. (R	eference, Pro-
Origin							
Kinds and per cer			ultications in				
Stage of maturity							
Quality of green f	eed						
Value for feeding:							
Dairy Cows	Beef Cattle	9	Hor	ses		Swine	Sheep
		E I					
	Chi	emico	ıl Composi	tion in F	Per Cer	at.	
			1			Per Cent	
Green Alf	alfa	Cor	verage nposition	Digest Coeffici	ents	Digestible Components	Nutritive Ratio
Dry matter		II ar					
Protein							
Fat							
Fiber							
N-free extract							
Ash				•••			
Carbohydrates							
Carbohydrates an	d fat				.=		1:
Total digestible m	atter						• • • • • • • • • • • • • • • • • • • •
Cost per ton	per 1	00 lb	s				
Cost per lb. of dig	estible matter	۲					

Exercise 1 (Continued)

General Remarks:

The state of the s Caroning and lat Total durentiale mutter,

THE WAS A STREET, AS DO NOT THE THE

EXERCISE 2. A STUDY OF DIFFERENT KINDS OF HAY

(Reference, Productive Feeding, Chapter XII)

Examine a sample of such of the following kinds of hay as are available: Timothy hay, mixed timothy and clover, red clover hay, alfalfa hay, hay from mixed grasses, grain hay, prairie hay, etc.

Determine the per cent. of different grasses or legumes in each, foreign materials, weeds, color, freedom from molds or rust, etc. Grade the hay according to the commercial grades adopted by the National Hay Association¹.

Give the various conditions affecting the value of market hay.

¹ Farmers' Bulletin 508; Woll, Handbook for Farmers and Dairymen, 6th Edition, p. 406a.

EXERCISE 3. TIMOTHY HAY

Fill out the ductive Feeding	ne blank sp g, Chapter Y		below f	for the	feed	given. (1	Refere	nce, Pro-
Origin								
Is it pure?								
If not, state chara								
		·						
Identify weeds if 1	present							
Quality of hay								
Value for feeding:								
Dairy Cows	Beef Cattle	е	Hor	ses		Swine	\$	Sheep
								7
	Ch	emic	al Compos	ition, in	Per Ce	nt		
Timothy	Нау	Con	verage mposition	Diges Coeffic		Per Cent Digestible Component	ts	Nutritive Ratio
Dry matter								
Fiber N-free extract								
Ash								
Carbohydrates				4				
Carbohydrates an	nd fat					•	1	:
Total digestible n	natter							
Cost per lb. of dig								1000 x

EXERCISE 3 (Continued)

General Remarks:

EXERCISE 4. MEADOW HAY

ductive Feeding;					d given.	(Itele	rence, 110	-
Origin								
Predominating gras	sses							
Is it pure?								
If not, state charact								
T1 //C 3-//C								
Identify weeds if pr Quality of hay								•
Value for feeding:								
Dairy Cows	Beef Cattle	e .	Hors	ses	Swine		Sheep	-
Duity Com								-
								_
	Ch	emico	ıl Composi	tion, in Per (Cent			
Meadow Ha	ıy	A	verage aposition	Digestion Coefficients	Per C Diges Compo	tible	Nutritive Ratio	
Dry matter					1			
Dry macter								
Protein								
Fat								
Fiber								
Pibel								
N-free extract								
Ash					1			
Carbohydrates								
Carbonydrates			• • • •	••••				
Carbohydrates and	fat						1:	
				- 1				
Total digestible ma	tter					- P		
Cost per ton	per 1	00 lb	s					
Cost per lb. of diges								

Exercise 4 (Continued)

Origin Country of above (red. quartered), station medium, stat. Country (red); summay, medium. Stage of matters whom yet. Minds and the resol of messi, present Value for resol of messi, present Country (resolution) Country (resolution)
Stage of materity when out. Minds and for seal of needs pressint. Value for feeding: Constant Conjunction, in For Conjunction Charles Conjunction Charl
Minch and par used of needs present Value forcing: Committee of the Content of Content
Chemical Copymation, in Per Cost Chemical Copymation District Chemical Continues Con
Cherry Star Companies Comments Statement State
Production Companying
Curtohydrans

Cost per ton par tital the

EXERCISE 5. CLOVER HAY

Fill out the ductive Feeding	-			for the fe	eed given	. (Ref	erence, Pro-
Origin							
Variety of clover (
variety of oldrer							
Quality (leafy, ste							
Stage of maturity							
Kinds and per cen							
Value for feeding:							
Dairy Cows	Beef Cattl		Hor	900	Swine		Sheep
Dairy Cows	Deer Catti		1101	ses	БМПе		Бпеер
	Ch	iemice	al Composi	ition, in Per	r Cent		
Clover Ha	By	A Con	verage aposition	Digestion Coefficient	Dige	Cent estible conents	Nutritive Ratio
D							
Dry matter							
Protein							
						2 7 4	
Fat							
					18.3		
Fiber							
N-free extract		. =					
Ash			5.4				
	18						
Carbohydrates					3 413		
Carbohydrates and	1 604						The Marie of the Control of the Cont
Carbony drates and	1 1at			• • • •			1:
Total digestible ma	atter						
Cost per ton	per 1	100 lb	s				
Cost per lb. of dig	estible nutrie	ents.					

Exercise 5 (Continued)

tion and the manufacture and beautiful and the state of the same

General Remarks:

EXERCISE 6. TO CALCULATE THE AMOUNT OF HAY IN A MOW

Rule: Multiply the figures representing the length and the width of the mow in feet, and this product by the average height of hay in the mow. In case of new mixed hay, timothy hay, or only partly filled mows, divide the product by 450. If old and well-packed hay, divide by 400. The quotient will give the approximate number of tons of hay in the mow.

Problem 1: A mow 40 x 36 feet is filled 24 feet deep with newly harvested hay,—how many tons are there in the mow?

Problem 2: How many tons of hay in a mow 36 x 52 feet, filled 28 feet high with old, well-packed hay?

EXERCISE 7. TO CALCULATE THE AMOUNT OF HAY IN A STACK

Rule: Multiply the width of the stack in feet by the "over" (i. e., the distance from the base of the stack on one side over the top to the base on the other), divide the product by 4, and multiply the quotient by the length. This gives the contents of the stack in cubic feet; for hay that has stood less than 30 days, divide by 512; 30 to 60 days, by 422; over 60 days, by 380. The quotient gives the tonnage of the stack.

Example: A two-months old stack is 30 feet wide by 40 feet "over," and 75 feet long. How many tons of hay does it contain?

EXERCISE 8. OAT STRAW

Fill out the ductive Feeding	_			for the	feed	given.	(Refe	rence,	Pro-
Origin									
Is it clean, bright,	and free from	n mu	stiness?.						
Quality									
Value for feeding:									
Dairy Cows	Beef Cattle	е	Но	orses		Swine		Sheep	
HT FILE									Jusy
	· CI	nemic	al Compo	osition, in	Per Ce	ent			
Oat Strav	W	Con	verage aposition	Diges Coeffic	tion ients	Per C Digest Compor	ible	Nutrit Rati	
Dry matter									4.1
						20 10 00	To all		
Protein									
Fat									
Fiber				1					
N-free extract									
Ash									
Carbohydrates		1							
Carbohydrates and	l fat							1:	
Total digestible ma	atter								
Cost per ton	per 100 ll	os. (o	r bale 1).		1/3				
Cost per lb of dim	estible nutric	ente							

¹ Give dimensions of bale in case of baled straw.

EXERCISE 8 (Continued)

General Remarks:

EXERCISE 9. CORN SILAGE

ductive Feeding, Chapter XV)

Fill out the blank spaces below for the feed given. (Reference, Pro-

Oligiii					
Quality					
Is there any mold	y or decayed	silage in the sa	mple?		
Flavor					
How long since sil	o was filled?.		v long since sa	mple was taker	n?
Maturity of corn	when cut for	the silo			
Approximate prop	ortion of grai	in in sample			
Value for feeding:					
Dairy Cows	Beef Cattl	e Hor	ses	Swine	Sheep
	C(1	amigal Common	ition, in Per Ce	en t	
	Ch	emicai Composi	aton, on I er ce		
Corn Sila		Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio
	ge	Average	Digestion	Per Cent Digestible	
Corn Sila Dry matter	ge	Average	Digestion	Per Cent Digestible	
	oge	Average	Digestion	Per Cent Digestible	
Dry matter	ge	Average	Digestion	Per Cent Digestible	
Dry matter	ge	Average	Digestion	Per Cent Digestible	
Dry matter	ige	Average	Digestion	Per Cent Digestible	
Dry matter Protein Fat	ige	Average	Digestion	Per Cent Digestible	
Dry matter Protein Fat	ge	Average	Digestion	Per Cent Digestible	

1:

Carbohydrates.....

Carbohydrates and fat.....

Total digestible matter.....

Exercise 9 (Continued)

bromole 2: How many tone of Indian com situes are left, in the lower

EXERCISE 10. To CALCULATE THE AMOUNT OF SILAGE IN SILOS

Calculate the content of the silo in cubic feet, and divide by 50. The quotient will give the number of tons of silage in the silo. The figure 50 is obtained by dividing 2000 by 40, the average weight of a cubic foot of Indian corn silage. In the case of a cylindrical silo, the cubical content is obtained by multiplying the square of the radius (one-half the diameter) by the height, and the product by 3.14.

The weight of a cubic foot of silage in the lower half of the silo, for silage made from nearly matured Indian corn, or from legumes at beginning bloom, may be estimated at 50 pounds, on the average, and that in the upper half at 35 pounds. In case of non-saccharine sorghums, milo, kafir, etc., small grains, alfalfa or clover somewhat wilted or cut at a rather advanced stage of maturity, twenty-five per cent may be deducted from the estimated capacity thus obtained.

Example: How many tons of silage will a silo hold, 18 feet in diameter, 36 feet high, if filled with Indian corn cut with kernels in the roasting stage?

Example 2: How many tons of Indian corn silage are left in the lower half of a 36-foot silo, 16 feet in diameter? How many tons of milo silage?

EXERCISE 11. THE SILO ON THE STOCK FARM

Explain the relation between the feeding surface of silage (the diameter of the silo) and the size of the dairy herd to be fed.

What are the outside limits for the diameter of silos adapted to practical farm conditions?

Example 1: How large should a silo be built, and how large a field should be planted to Indian corn, for supplying a herd of 25 cows, to be fed 30 pounds of silage per head daily for a period of 150 days?

is completely controlled the bolls of a fortal a controlled to the second it

Machine Co. No. of Machine Co. No. Lot of Co. Lot of Co

Example 2: How long will the silage last in a completely filled silo, 16 feet in diameter, 36 feet high, when fed at the rate of 28 pounds per head daily to a herd of 35 dairy cows?

Exercise 11 (Continued)

Example 3: How can a silo be filled twice during the year with crops grown on the same land (applies to the southern and southwestern states mainly)? Mention silage crops to be grown; give approximate time of sowing or planting, and cutting the crop for the silo, and feeding the silage, in case of both crops.

Counce of Legislands blomes

Example 4: Corn silage in a 16-foot silo filled 35 feet deep will be fed to a herd of 28 milch cows, to 12 steers and to 150 sheep at the rate of, respectively, 35, 24, and 3 pounds per head daily. How long will the silage last?

30

EXERCISE 12. A STUDY OF MARKET PRICES OF FEEDING STUFFS

Compute the weekly market quotations of the feeds given in the following list from one of the main agricultural papers of the state, preferably for a period of several years. Several feeds may be assigned to each student in order that a longer period may be compared and the figures obtained may have general value. Where no market quotations are available, the cost given in the feed bulletins of the various experiment stations or the feed inspection bureaus may be used. In the case of feeds where no market quotations or prices are available, the figures for local prices to be adopted should be decided after careful consideration and discussion in the class:

Roughage

Timothy hay Mixed timothy and clover Red clover hay Alfalfa hav Hay from mixed grasses (meadow hay) Grain hay Prairie hav Pea-vine hay Pasture Green sorghum Corn stover Oat straw Corn silage Alfalfa silage Mangels Sugar beets

Exercise 12 (Continued)

Concentrates

Indian corn

Corn-and-cob meal

Oats

Barley

Wheat

Mile of the transplant of early and solution at the first solution

Wheat bran

Wheat middlings

Red dog flour

Hominy feed

Gluten feed

Buckwheat middlings

Buckwheat feed

Dried brewers' grains

Malt sprouts

Dried distillers' grains

Linseed meal

Cottonseed meal

Cottonseed hulls

Coconut meal

Dried beet pulp

Molasses beet pulp

Molasses

Skim milk

Whole milk

Tankage

EXERCISE 13. PRELIMINARY STUDY OF CONCENTRATED FEEDS

1. Give a list of six common stock feeds in your state that are chiefly valuable on account of their protein contents; likewise a list of six feeding stuffs that are classed as carbohydrate or starchy feeds, of six that are especially high in fat (oil), and of six that are especially high in fiber.

STANT IN	High-protein Feeds	Carbohydrate Feeds
1	AND AND PARTY OF THE PARTY OF T	Timer out seconds how metragemen to
2		2
3		3
4	marginal to different thousand	4. Here touched the case a Annual
5		5
		6
0		the streether the rank collection between
	Feeds High in Fat	Feeds High in Fiber
1	Feeds High in Fat	Feeds High in Fiber 1
2		1 2
 3 		1
 3 4 		1
 3 4 		1

Exercise 13 (Continued)

2. Obtain samples weighing about a pound each of as many concentrated feeds as can be found in the local feed stores; note the guarantees on the sacks in each case and the retail cost of each feed per ton and per 100 pounds; tabulate the figures either in the note book or on the blackboard and make comparisons between the cost and the digestible components, energy and feed-unit values. Place the feeds in the order of increasing cost, according to the three methods of comparison, and discuss the results obtained (Productive Feeding, Chapter X).

¹ Productive Feeding, Tables I, III, IV in Appendix.

EXERCISE 14. TESTS FOR ADULTERATIONS OF CONCENTRATES

Examination for impurities: Separate samples of 100 grams of the feed into three portions,—coarse, medium and fine, by means of two sieves, 20-and 80-mesh (or into two portions by means of 50-mesh sieve). Examine carefully each part for foreign matter: hulls (oats, rice, barley, buckwheat), grain screenings, whole weed seeds, elevator or mill sweepings, ground corn cobs, sawdust, ground stone pits (olive, brazil nuts), ground peanut hulls, ground coffee hulls, sand, etc.

Examination for moldiness: 5 grams of the ground sample are mixed with distilled water, poured on a Petri dish (or a saucer) and kept at 80 to 100 degrees F. for 24 hours or more. Examine for colonies of molds or bacteria with a magnifier and compare these with those found in the case of similar feeds of known purity.

Weed seeds in concentrates: Separate and count the weed seeds in (a) 10 grams and (b) 20 grams of the thoroughly mixed feed sample and calculate the average of the two. Determine their number in one pound and one ton of the feed (one pound Avoirdupois equals 453 grams).

Identify as many of the weed seeds as possible by comparison with a standard collection of weed seeds, and give the number of noxious weeds in the sample. (A collection of 200 economic seeds is prepared for schools by the Bureau of Plant Industry, U. S. Dept. of Agriculture).

Sand and mineral impurities: Place a tablespoonful of the feed in a tumbler, fill this three-fourths full with water, stir vigorously and pour off carefully the turbid liquid; repeat this until the top liquid is clear. The sediment will consist of sand, calcium carbonate, gypsum, or other mineral impurities, most of which may be readily identified. The per cent present may be determined approximately by drying and weighing the sediment, provided a definite amount of feed was weighed out, e. g., 20 grams.

EXERCISE 15. INDIAN CORN (CORN MEAL¹)

Fill out the blank sp			given. (Re	ference, Pro-
ductive Feeding, Chapter	XVI)		ibus - Ingolas	
Origin			7.E.P. (7.19)	Janes III.
Race and variety			W	
Quality (hard or soft, plump or	shrunken, dry	or damp, etc.)	44.0
Impurities	in little in			efftyres, oldry
Value for feeding:				
Dairy Cows Beef Cattl	e Ho	rses	Swine	Sheep
THE SERVER IN THE 2 PRINT SERVE			CONTRACTOR OF THE PARTY OF THE	Leadle and a sive
appetent to shirt to simi	mine for soil	med along	in much his	of Stemmob
The state of the s	emical Compos	ition, in Per Cer	nt	tegant o differ
Indian Corn	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio
Dry matter	voctoritye sint	Landario and L	on Fant 1	the average
	Sala guragan	is electrical	A linned out) liber sitr fa
Protein	Bond Fr die	in thinks that	HI THERETO SA	Citional -
III sessiii spokanele midili	per mir own	IIIII - Strong in	ox to notion	Too Talebunts
Fat		one the high	Illinoison Asi	-orderes our
Titl	marks for skilling	L SHIT LON	mai dipelit i	is transmer out
Fiber	social state and	mally will cause	nel letteride 1	this lare. Pa
N. C. STANDER OF THE STANDARD	mir tille justi	a sitter Hay	elband-walt	Mer, III the
N-free extract	not not fur	un mids sang	er philippin filed	int of the test
A.L. Brighter Months 34 artis	I Stanford	an american	orms to team	on Har tring
Ash	John Mashi	liberated year	Edulative So	Tour Son France
Carbohydrates	w/ bill gui	The borner	disconding of	be determin
	The state of the s	.1.00.10.00.00.00.00	CHECKS AND SAN	
Carbohydrates and fat				1:
Total digestible matter				

¹ If corn meal, separate 50 grams of the sample in two portions by means of a 50-mesh sieve. Weigh each portion and calculate per cent of fine- and coarse-ground. Also examine for odor, moldiness or mustiness.

Exercise 15 (Continued)

Cost per ton.	per	lb	wolled and		
General Rema					
upplier of his					
Average Mark				Transaction To	eliosa teora ytranoli

	Smerre			mittall hoti	
	Per Cont Digestible Components				1 Copie and Cop
					fled.
:1					lina reggiordoduiQ
					Potal dissettle me

EXERCISE 16. CORN-AND-COB MEAL

ductive Feeding, Chapter		for the feed	given. (Rei	erence, Pro-							
Origin											
Guarantees: Per cent protein.	:Per cer	nt fat	Per cent fiber (max.)							
Purity											
Identify weed seeds, if present											
Quality											
Value for feeding:											
Dairy Cows Beef Catt	le Ho	rses	Swine	Sheep							
Che	emical Composi	tion, in Per Cen	nt .								
Corn and Cob Meal	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio							
Dry matter											
Protein											
Fat											
Fiber											
N-free extract											
Ash											
Carbohydrates	• • • •										
Carbohydrates and fat				1:							
Total digestible matter											
Cost per ton				Medicate							
20											

EXERCISE 17. TO MEASURE CORN IN CRIBS

When the crib is equilateral: Multiply the length by the breadth, and that again by the height, all expressed in inches, and divide the product by 2748 (the number of cubic inches in a heaped bushel); the quotient will be the number of bushels of ears. Two-thirds of the quotient will represent the number of bushels of shelled corn.

Example: Find the number of bushels of shelled corn contained in a crib 12 feet long by 6 feet wide and 8 feet high, filled with ear corn.

When the crib is flared at the sides: Multiply half the sum of the top and bottom width by the perpendicular height, all expressed in inches, and that again by the length in inches, and divide the product by 2748; the quotient will be the number of heaped bushels of ears. Two-thirds of the quotient will represent the number of bushels of shelled corn.

Exercise 18. Oats

	-				ference, Pro-
ductive Feeding,					
Origin					
Quality (well cleaned					
Impurities					
Value for feeding:			Hom Alban		d min test Sk
Dairy Cows	Beef Cattle	Hor	ses	Swine	Sheep
					CT CT
	CI	hemical Compo	sition, in Per (Cent	
Oats		Average Composition	Digestion	Per Cent Digestible	Nutritive
Oats		Composition	Coefficients	Components	Ratio
Dry matter				CARCELL	
Protein				The strains	
Fat					
Fiber					
N-free extract	THE .				
N-Mee extract					
Ash					
Carbohydrates					
Carbohydrates and	fat				1:
Total digestible ma	tter				
Cost per ton					
Cost per pound of o					
Weight of 1 bushel. General Remarks:					
General Remarks.				out et diage	
				DIT IN 150 THE	
		• • • • • • • • • • • • • • • • • • • •			

EXERCISE 19. TO DETERMINE PER CENT OF HULLS IN OATS

Weigh out and examine carefully two lots of 100 oat kernels from a well-mixed sample of oats, and record the weights below. Separate the hulls of the kernels in each lot by means of a scalpel or penknife, and weigh them carefully; also any impurities that may be present. Calculate the percentage of this weight to that of the whole oats.

	Weight of Oats	Weight of Hulls	Per cent Hulls
Sample 1	negle w digorativ s		en) in revision
Sample 2	H		and otherwise to co
		Average	

What is an average figure for per cent of hulls in heavy, medium, and light oats?

Exercise 20. Corn and Oats, "Ground Feed"

			for the	feed	given. (F	Reference, Pro-
ductive Feeding					A Laboratoria	
Guarantees: Per o						
Purity						
Identify weed seed						
Fineness of feed ()						
Odor (fresh, damp						
Quality						
Value for feeding:						
Dairy Cows	Beef Cattl	e Ho	rses		Swine	Sheep
	Chi	emical Composi	ition, in	Per Ce	ent	
Corn and	Oats	Average Composition	Diges Coeffic	tion ients ¹	Per Cent Digestible Component	Nutritive Ratio
faur madibum a	and mal	at to topo	out here	ahaji.	ssprinya di	Della Joli II
Dry matter						resno vagu
Protein						
Fat						
Fiber						
N-free extract			311			
Ash						
Carbohydrates		• • • •				
Carbohydrates an	d fat					1:
Total digestible m	natter					
Cost per ton	per l	b				
Cost per lb. digest	tible nutrients	s				
General Remarks	:=					
	(0 17					

 $^{^{1}}$ Assuming "Ground Feed" was composed of equal parts, by weight, of corn and oats. 42

EXERCISE 21. BARLEY

Fill out th	e blank sp	paces	below	for the	feed	given. (I	Refer	ence, Pro-
ductive Feeding	, Chapter	XVII	()					
Origin								
Quality (well clear	ned, plump,	brigh	t, freedo	m from o	other g	grains)		
Mechanical condit	tion (whole,	groun	d, rolled)					
Impurities								
Value for feeding:			S. Legals		19 30		prito	dealnein'
Dairy Cows	Beef Catt	le	Но	rses		Swine		Sheep
I SERVER I S				- 57		Di sal		
Tomorbie or year	Ch	emica	l Compos	ition, in I	Per Cen	nt .		
Barley			verage nposition	Diges: Coeffic		Per Cent Digestible Component	12	Nutritive Ratio
Dry matter					1000			nAmin vell
Protein		lig-sc di		3				
Fat								
Fiber								
N-free extract				a 14 Gro			24	
Ash				ra Cal				
Carbohydrates		i i						
Carbohydrates and	d fat		• • • •					1: ededs 2
Total digestible m	atter					- tolk		E
Cost per ton								
Cost per lb. of dig								
Weight of 1 bushe		1 qı	uart					on other
General Remarks:								

EXERCISE 22. MILO MAIZE (OR OTHER GRAIN SORGHUMS)

				for the	feed	given. (Ref	erence, Pro-
ductive Feeding	;, Chapter Y	(VI)			1490			
Origin								
Strain and variety								
Quality								
Impurities								
Value for feeding:					,		203	SEL THE SELECT
Dairy Cows	Beef Cattle		Hor	ses		Swine		Sheep
	Che	mica	l Composi	tion, in I	Per Cer	nt		
Milo Mai	ze	A	verage aposition	Diges: Coeffic	tion ients	Per Cent Digestible Component	s	Nutritive Ratio
Dry matter								musa citl
Protein								
Fat								and and
Fiber								
N-free extract								Notes and the
Ash								
Carbohydrates								
Carbohydrates and	d fat					TAL O	4	1: visite (u.C.)
Total digestible m	atter					(51/2)		ertinally fatory
Cost per ton								med and month
Cost per lb. of dig								
Weight of 1 bushe		.1 qu	ıart					
General Remarks:								
								Tropies and the same
4.4								

EXERCISE 23. GRAIN SCREENINGS

(Reference, Productive Feeding, Chapter XVI)

Weigh out two portions of 10 grams each and separate them into four different parts as follows: (1) kernels of grains or other economic plants, (2) weed seeds, (3) chaff, straw, etc., and (4) dirt, sand, etc.

Weigh each portion separately and calculate the per cent in the screenings. Identify as many of the different weed seeds as possible by comparison with a standard seed collection.

Weigh separately the weed seeds present in large numbers and calculate the per cent in the screenings.

Identify noxious and poisonous weed seeds in the sample, giving the number of each, and calculate the number in one pound and one ton of the screenings.

Composition of Grain Screenings.

10.0	Sam	ple 1	Sam	ple 2	Average Per
10 Grams Contained	Weight	Per Cent	Weight	Per Cent	Cent
1. Kernels of grains, etc	ata in the same				
2. Weed seeds					Allen ext
3. Chaff, straw, etc					zminor9
4. Dirt and sand					. 1

Noxious Weeds Present in 10 Grams of Screenings

	****	Per Cent	N. 1	Numberin		
Name	Weight	Per Cent	Number	1 Pound	1 Ton	
			2 10 1		The Mark	
				E 1		
				1.21.14.15.1111	weather a	
				patialitatili	each intel	

EXERCISE 24. WHEAT BRAN

Fill out the ductive Feeding			ow for the	feed giv	ren. (Rei	ierence, Pro-
Origin						
Guarantees: Per c	ent fat	Per cent p	protein	Per cent f	iber (max.)	
Quality (Roller or	Country-mill	, freedom	from mustin	ess or mold	ls)	
Proportion of flou	ry material.					
Impurities		:				
Number of whole	weed seeds in	10 grams				
Value for feeding:						
Dairy Cows	Beef Cattle		Horses	Swir	ne	Sheep
			-0.1 E			
	- CI	1 1 0		D 0 1		
-2016/06/15	Chi	emical Con	nposition, in		D G (
Wheat Br	an	Average Compositi		tion I	Per Cent Digestible omponents	Nutritive Ratio
Dry matter						SVET
21y maccol IIII						
Protein				- 19		
			1 7 7 5			
Fat						
Fiber			11-			
11001			The problem	4-2	V4F	
N-free extract			THE PARTY			
many Laboret						
Ash						
Carbohydrates			• • • • • • • • • • • • • • • • • • • •	•		
Carbohydrates and	l fot					
Carbony drates and	1186					1:
Total digestible ma	atter	- Z				· · · · ·
Cost per ton	per lb					
Cost per lb. of dige						
Weight of sacks						
46						

	Exe	RCISE 24 (Cont	tinued)	
General Remai	rks:			Will out the
	in radii san ad			
	25 (athlon		of flour, freedom	making (propostum
		mus iti bimol shone i		
The special section				Date Over

		Preparation Continues Cont	
Carbolization :			
Carbolophistee and ful			

Cost per ton per lb.
Cost per lb of dig stible nutringle.
Weight per suck per grant.

EXERCISE 25. WHEAT MIDDLINGS

Fill out the ductive Feeding			below	for the	feed	given. (Refe	erence, Pro-
Origin								
Guarantees: Per	cent protein.		Per cent	fat	Per	cent fiber (max	.)
Kind of middlings	(flour, stand	ard o	r shorts).					
Quality (proportio	on of flour, fr	eedon	n from mu	istiness or	molds	s)		
Are ground screen	nings or whol	e wee	d seeds fo	und in sa	mple?			• • • • • • • • • • • • • • • • • • • •
Value for feeding:								
Dairy Cows	Beef Cattl	le	Hor	ses		Swine		Sheep
								Company to the
	Ch		l Composi	tion in P	on Con		7 7	
	Cn	emica	t Composi	tion, in I	er cen			
Wheat Mide	dlings	Con	verage nposition	Digest. Coefficie		Per Cent Digestible Component	s	Nutritive Ratio
Dry matter								
Protein			10年間					
T7 /								
Fat				450				
Fiber								
N-free extract		114						
Ash								
Asii								
Carbohydrates								
Carbahadratasan	J f., t	Ø 19						
Carbohydrates an	a lat							1
Total digestible m	atter							
Cost per ton	per 1	b.:						
Cost per lb. of dig								
Weight per sack.		er qu	art					

Exercise 25 (Continued)

General Remarks					
				aliahora Ans	Origin Communes: For a Quality Impurities Value for feeding
		ting the Re	integrand a Aten dia	MD 3	
wkitirbijska - fas otrezi	Per Cont	and taken			
检					dak
				100	
				and the	Unredediction of
Polish Highest his no					Total disputible i
Cost one had the lack Cost per the of ally Wright and made Respond Hermitian					Cost per land Cost per lle of di Women per soch Control Remain

EXERCISE 26. RED DOG FLOUR

Fill out the blank sp ductive Feeding, Chapter Y		for the feed	given. (Re	ference, Pro-
Origin	Per cent		er cent fiber (m	ax.)
Dairy Cows Beef Cattle	e Hor	ses	Swine	Sheep
Cha	emical Composi	tion, in Per Cer	nt	
Red Dog Flour	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio
Dry matter				
Protein				
Fat				
Fiber				
N-free extract				
Ash				
Carbohydrates				
Carbohydrates and fat				1:
Total digestible matter	T	- m		
Cost per ton	nts			

Exercise 27. Buckwheat Feed

					eference, Pro-
ductive Feeding	THE PERSON NAMED IN THE	Marie Control of the			io rigioW.
Origin					
Guarantees					ana semilhisan
Quality Per cent hulls		four	az motoviola 1		
Value for feeding:			y materiais		
Dairy Cows	Becf Cattle	e Hor	909	Swine	Sheep
Daily cons				-	ысер
	Che	emical Composi	tion, in Per Cer	nt	kan/lisbiff.
Buckwheat	Feed	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio
Dry matter					
30; 0=1/40; 11					
Protein	en fin blo			in bue mand	
	outland les				med if placed the hint of the
Fat					rold dust a si
Fiber					six lo alquin
Fiber					
N-free extract					
Ash					
G 1 1 1 1					
Carbohydrates		••••	••••		
Carbohydrates and	l fat				1:
Carpen reference			No in the		
Total digestible m	atter			*	
Cost per ton	,per ll	o			
Cost per lb. of dige	estible nutrie	nts			
Weight per sack	1	quart			
General Remarks:		Elgy (E)			

¹ See following exercise.

Exercise 28. A, To Determine Per Cent of Hulls in Buckwheat Feed

Weigh out 100 grams of the thoroughly mixed sample and separate it into two portions by means of a 50-mesh sieve. Weigh each portion, repeat the experiment and average the results. Calculate percentages of hulls and middlings present in the sample.

	Sam	ple 1.	Sam	ple 2	Average
	Weight	Per Cent	Weight	Per Cent	Average Per Cent
Hulls			-trans-		Chella G
Middlings					
		•			
			Total.		- University

B, TEST FOR RICE HULLS

Pure rice bran and rice meal contain considerable fat, and are not moistened if placed on the surface of water. When a teaspoonful of a sample of rice bran or rice meal adulterated with hulls is placed on the surface of water in a tumbler the hulls will soon sink into the water. Make the test with a sample of rice bran or meal of known purity for comparison.

EXERCISE 29. GLUTEN FEED

ductive Feeding Origin								
Guarantees: Per c	ent fat	Per	cent pr	otein	F			
Quality Impurities								
Is it artificially col Value for feeding:								Coulais)
Dairy Cows	Beef, Cattle	e	Hor	ses		Swine	S	heep
Zandis Z	Visited			7)-	- 1962	et peat	19100	20 10
	Ch	emical	Compos	ition, in I	er Ce	nt		
Gluten Fe	ed	Ave		Digest Coefficie		Per Cent Digestible Components		Tutritive Ratio
Dry matter								
Protein								
								The state of the s
Fat						3-35-x		
Fiber							1	
N-free extract								Nother con
Ash				1				
Carbohydrates		••	•		•			
Carbohydrates and	d fat			• • •		and be	1:	
Total digestible m	atter			•		251261	n skribbe	in land
<u> </u>	11	h		4 4				E WINE
Cost per ton	per 1	U						

¹ If so stated on sacks; may be determined by noting the color of the water extract.

EXERCISE 30. DRIED BEET PULP

Fill out the b ductive Feeding, Cl	_		for the fe	ed given.	(Reference, Pro-
Origin Is it plain dried beet p Is it clean, bright and c Color Quality Value for feeding:	ulp or dri free from	ed molasses mustiness, o	r lumpy?		
Dairy Cows	Beef Cattle	H	orses	Swine	Sheep
	Che	mical Compos	sition, in Per	Cent	
Beet Pulp		Average Composition	Digestion Coefficien	Per Cen	le Nutritive
Dry matter					Tightim verti
	ne i				Paralling Tables
Protein			No.		and the of Space
Fat					S S Lead withing
					Police
Fiber					
N-free extract				TE ME	togrifor male VE
					del.
Ash					
Carbohydrates				The same	- Hambulled and
Carbohydrates and fat				161	Contrate state and state
Total digestible matter	•••••		Pion	musi	m pelipegie beef.
Cost per ton	le nutrier	nts		off and chartening alofts in 3	Cost per lon Cost per lo, of degre Cost per ll, of degre Reight of sucks Control Hematics

EXERCISE 31. TEST OF WATER-ABSORPTION BY DRIED BEET PULP

Weigh out 10 grams of the dried pulp and place in a beaker with 100 c.c. of water, mix well by stirring with a glass rod or spoon and cover with a watch glass. Leave standing until the following day or at least 6 to 8 hours. Pour off and weigh excess of water and figure ratio of amount of water absorbed to weight of pulp.

Repeat experiment with a sample of dried molasses beet pulp.

Exercise 32. Dried Brewers' Grains

Fill out th	e blank sp	paces below	for the	feed given	. (Ref	erence, Pro-
ductive Feeding	, Chapter 2	XVII)				
Origin				####		world of a law.
Guarantees: Per ce	ent protein	Per cen	t fat	Per cent	fiber (m	ax.)
Purity						
Cereal grains ident						
Quality						
Value for feeding:						
Dairy Cows	Beef Cattle	е Но	rses	Swine		Sheep
	Che	emical Compos	ition, in Pe	er Cent		
Dried Brewers'	Grains	Average Composition	Digestic Coefficie	Dige Dige	Cent estible conents	Nutritive Ratio
Protein						
Carbohydrates and	d fat					1:
Total digestible ma	atter					
Cost per ton Cost per lb. digesti Weight per sack	ible nutrients					

Exercise 32 (Continued)

General Remark	rks:					Fill out (I ductive Feeding
		i. deli			moong has	Origin Coirciline (E) Core
		on, in Per Co	i mygienti			
ightheast careff				e Com		neural toyit
						Line Sanstille
i u						
						N-lago cottaget
						Corbobydrapies an

EXERCISE 33. DRIED DISTILLERS' GRAINS

Fill out the ductive Feeding,			for the	feed	given. (H	Reference, Pro-
Origin	ENGLISH COLD					
Guarantees: Per cer						
Cereal grains identif	_					
Purity						
Identify weed seeds	if present.					
Quality						
Value for feeding:	New York					
Dairy Cows	Beef Cattl	le H	orses		Swine	Sheep
			-			
	Ch	emical Compo	sition, in I	Per Cer	nt	Nongre in
Dried Distillers'	Grains	Average Composition	Diges Coeffic	tion ients	Per Cent Digestible Components	Nutritive Ratio
Dry matter						
Protein						
Fat						
Fiber						
N-free extract						
Ash			•••		••••	
Carbohydrates			• • •			
Carbohydrates and	fat	••••				1:
Total digestible mat	tter	••••				
Cost per ton Cost per lb. of diges	-					

Weight per sack.....per quart.....

Exercise 33 (Continued)

General Remarks:									
ductive Feedlag Chapter									
· · · · · · · · · · · · · · · · · · ·									
villoof .									
Medianical candition time-in course-graquit, per size, our particles of the language.									
			aniw8						
		Digest			National Parish				
Fruterin									
Para Maria									
N-from extract									
that the state of									
					er er				
Cont pot (on, per lli									

EXERCISE 34. LINSEED MEAL

	_		for the	feed '	given. (F	Reference, Pro-
ductive Feeding						
Origin						
Is it old-process or	A Company of the Company					
Quality						
Mechanical condit						
Impurities						
Value of feeding:						
Dairy Cows	Beef Cattle	Ho	rses	\$	Swine	Sheep
	Chen	nical Compos	ition, in P	er Cent		
Linseed M	féal	Average Composition	Digest Coeffici	ion ents	Per Cent Digestible Components	Nutritive Ratio
Dry matter						
Protein						
Fat						
140						
Fiber						
N-free extract						100 N
Ash						
Carbohydrates						
Carbohydrates and	l fat					1:
Total digestible ma	atter					
Cost per ton	per lb.					
Cost per lb. of dige	stible nutrients					
Weight of sacks 60	1 qu	ıart				

Exercise 34 (Continued)

General Remarks: and account to the pull of the analysis of the continuous and the second of the continuous and the second of the continuous and t

	Ulacian	
	enter disc	

Yest feet stored: Add a feet drops of todine solution to the clear liquid in each number and note the color. Is starch present in either case?

A mean delicate test for starch may be made by ribeing a very small amount of the finely pulverized meat on a abde, mixing it with a rample of drops of that fleet water, and adding a drop of louise solution. Examine made from minusescope for this colored specks.) Starch is not present in meal made from observe colored specks.)

Compatibility and the control of the

EXERCISE 35. THE SWELLING TEST FOR LINSEED MEAL

Pulverize a small amount of the meal and place a level teaspoonful of it in a tumbler; add 10 teaspoonfuls of boiling hot water to the meal. Stir thoroughly and allow to settle. Old-process meal will remain jelly-like on standing, while the new-process meal will settle in the course of an hour and leave a clear yellowish solution on top. See Fig. 38 in Productive Feeding. About what proportion of clear water is left on top in case of each sample?

Test for starch: Add a few drops of iodine solution to the clear liquid in each tumbler and note the color. Is starch present in either case?

A more delicate test for starch may be made by placing a very small amount of the finely pulverized meal on a slide, mixing it with a couple of drops of distilled water, and adding a drop of iodine solution. Examine under microscope for blue-colored specks. Starch is not present in meal made from clean, well-matured flaxseed.

Exercise 36. Cottonseed Meal

Fill out the blank			for the	feed giv	ven. (Ref	erence, Pro-	
ductive Feeding, Chapter							
Origin							
Guarantees: Per cent protein							
Color							
Quality						PERSONAL PROPERTY AND PROPERTY OF THE PERSON NAMED IN COLUMN TWO PERSON NAMED IN COLUMN TO A RESIDENCE OF THE P	
Impurities (see following exer							
Is it fine or coarse-ground, pe	ea or nu	it size, et	er				
Value for feeding:		110-12706			Description 1		
Dairy Cows Beef Car	ttle	Ho	rses	Swir	ie	Sheep	
with want of colours drive	misv		esconlari.		d Borrio		
thant he imath;	Chemical	l Compos	ition, in P	er Cent			
Cottonseed Meal	Average D			on 1	Per Cent Digestible Emponents	Nutritive Ratio	
Dry matter							
Protein					15-5.4		
Fat	. v 00	rade of	no la como	od open	death in		
	m's			d to mie	dara wais		
Fiber							
N-free extract							
Ash				8 1			
Carbohydrates							
Carbony drates		relatio	e value	of esti	ensuel -		
Carbohydrates and fat	amin.	olf (1:	
Total digestible matter						🧇	
Cost per tonper	lb						
Cost per lb. of digestible nutri							
Weight of sacks						62	

Exercise 36 (Continued)

as a twith a central of

General Remarks:

EXERCISE 37. TEST FOR IMPURITIES IN COTTONSEED MEAL

Place a teaspoonful of the meal in a tumbler and pour over it $1\frac{1}{2}$ to 2 oz. of hot water. Stir the mass until it is thoroughly wet and all the particles are floating. Allow it to subside for from 5 to 10 seconds and pour off. If a large amount of fine, dark-brown sediment has settled in this time (a sediment noticeably heavier than the fine mustard-yellow meal and one which upon repeated treatments with boiling hot water keep settling out) the goods are a feed meal, i. e., meal containing relatively large quantities of ground hulls. All meals contain small quantities of hulls and show dark specks. If, however, there is found a large amount of this residue, one which persists in remaining after several washings and decantings, it is surely composed of hulls and the goods are a feed meal or an adulterated cottonseed meal.

The results of the test are very striking when a feed meal is compared with a meal of known purity, which is similarly tested at the same time (Vermont station).

Question 1: How many pounds of cottonseed meal, hulls and oil are obtained, on the average, from a ton of cottonseed in modern mills?

Question 2: What are the relative values of cottonseed meal and Indian corn for feeding farm animals?

EXERCISE 38. COCONUT MEAL

Fill out the blank sp	paces below	for the feed	given. (Re	ference, Pro-
ductive Feeding, Chapter				
Origin			. W. Ti. vol. 4.	. spoiterit res
Guarantees: Per cent protein.	Per cer	nt fatP	er cent fiber (m	ax.)
Quality				. A. P. Constitute
Flavor (pure, aromatic or ranc	id)	H. Iod. galler.		
Is it lumpy?				
Impurities				CHARLES COMMITTEE
Value of feeding:	af bitta jinishir	are in this late	anus cered #1	these, is torne
Dairy Cows Beef Catt	le Ho	rses	Swine	Sheep
	LANGEST PARTY			A THE READ
interaction as to regularity in	nesta necter	re grew trach		Den HET
C)	hemical Compos	nition, in Per Ce	nt	lean a darw
Coconut Meal	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio .
Dry matter				
Protein				
Fat				
	Les apolites	in should be	t: How man	not be seed that the
Fiber	il become	A HARLE STORY	T STREET, THE	is no Jenial
N-fiber extract				
Ash				
				7 3 3 3 3 3
Carbohydrates				
		2 9		
Carbohydrates and fat	10 = U V =	printer and so	19/1/1/	1:320
			terat garbaot	diam mary 10t
Total digestible matter		1		
Cost per tonper l	lb			The second
Cost per lb. of digestible nutri				
Weight of sacks1				
General Remarks:				
66	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	•••••	

Exercise 39. Tankage

	e blank sp								Pro-
ductive Feeding									
Origin				ont coloi:		oarbata			
Purity						-			mir L
Quality									HITA
Value for feeding:									
Dairy Cows	Beef Cattle	e	Hors	ses		Swine	200	Sheep	nalase.
	1 10000		To assert	n a l	i marina			And Trade	
	Ch	emica	l Composi	tion, in I	Per Cer	nt			
Tankag	e	Com	verage aposition	Digest Coeffic	tion ients	Per Cer Digestib Compone	le	Nutri Rat	
Dry matter									
Protein									
Fat									
Fiber			Rail						
N-free extract									
Ash			×						
11.311									
Carbohydrates									
Carbohydrates an	d fat					100	1004.0	1:	
Total digestible m	atter					No.			ies.FE
Cost per ton Cost per lb. digest General Remarks:			p	er lb. di				and For	100 200 200 200 200 200 200 200 200 200

67

Exerci	se 40a. 1	VAME	of FE	ED			
Fill out the or swine feeds, ca					-		
Origin							
Guarantees: Per cer Purity							
Are whole weed seed							
If se, identify the r							
Value for feeding:							• • • • • • • • • • • • • • • • • • • •
					5372		
Dairy Cows	Beef Cattle	e «	Hor	ses	2	Swine	Sheep
					دبيتنا		
	CH	remico	al Compos	ition, in 1	Per Cen	ıt	
	are all		verage iposition	Digesti Coefficie		Per Cent Digestible Components	Nutritive Ratio
Dry matter						The state of the s	Carrie Committee
							imates f
Protein							
Fat		3.5					SIVE NO.
1.000							4500
Fiber							
N-free extract							N-fitte intenci
N-Hee extract							
Ash							
0.1.1.1			. 41				and plots
Carbohydrates							
Carbohydrates and	fat						1:
Total digestible ma	tter						THE WAY
					•	•	1
Cost per lb. of diges	A					curio bidition	
General Remarks:	Jenoie mar(el						

Exerc	CISE 40b.	NAME	of Fr	ED	mir.	. 200- 22220	rzil Ex			
Fill out the	e blank spa	ces b	elow for	r the fee	ed giv	en.				
Origin	ent protein		. Per cen		Pe					
Purity Are whole weed se										
If so, identify the	A STATE OF THE PARTY OF THE PAR									
Value for feeding:	Value for feeding:									
Dairy Cows	Beef Cattl	le	Ho	rses		Swine	Sheep			
Chemical Composition, in Per Cent										
Wall!	Per Case Manageria		verage aposition	Diges Coeffic		Per Cent Digestible Components	Nutritive Ratio			
Dry matter				7			waten east			
Protein										
Fat		av e					. A. Hart			
Fiber		•					TAKES			
N-free extract							Numerican State of the State of			
Ash							- July			
Carbohydrates							(reductive terror			
Carbohydrates an	d fat					in the	1: 1: 1			
Total digestible m	natter				. 1	2631500 x	disdiar			
Cost per ton	per 1	100 lbs	3							
	Cost per lb. of digestible matter									

EXERC	ISE 40c. 1	VAME	e of Fe	ED		. All. carries	neil .
Fill out the	blank space	es b	elow for	the fee	d give	en.	
Origin							
Guarantees: Per ce	ent protein		.Per cen	t fat	Pe	er cent fiber (n	nax.)
Purity							
Are whole weed see	eds present?						
If so, identify the	main kinds	and d	letermine	number	of nox	ious weeds in	one pound
							H-13C A HILLY
Value for feeding:							
Dairy Cows	Beef Cattl	e	Ho	rses		Swine	Sheep
A S C I S I S	C	hemic	al Compo	eition in	Per C	ent	
						. Per Cent	1
		Cor	verage mposition	Diges Coeffic	tion ients	Digestible Components	Nutritive Ratio
Dry matter			- 7				Description.
Protein							Problem
Fat							1840
Fiber							and L
N-free extract							nether only
Ash							and the state of
Carbohydrates							otanisilanara
Carbohydrates and	l fat						Theorem I
Total digestible ma	atter					laTouri a	Chespl Jane
Cost per ton Cost per lb. of dige General Remarks:						tede akithasyte	Contactor of the contact that the contac

Exerc	ise 40d.	NAMI	e of Fe	ED	Z	.r2	
Fill out the	blank spa	ces b	pelow fo	r the fee	d giv	en.	
Origin							
Guarantees: Per ce							
Purity							
Are whole weed see	Asserting between the con-	and the same					
If so, identify the	main kinus	and d				ous weeds in	one pound
Value for feeding:							
Dairy Cows	Beef Cattl	e	Hor	ses		Swine	Sheep
	1915 3	ps V an	(/ ₁ 00mlayer)	medaline			
	C	hemic	al Compos	sition, in	Per Cer	nt	
	Dissill Company	Con	verage aposition	Digest Coefficie	ion ents.	Per Cent Digestible Components	Nutritive Ratio
Dry matter							TEAM IN THE
Dry matter							Production
Protein							
E-4							10-11-18
Fat							1
Fiber							
Shareman i	W. Link		- 41				New most
N-free extract							
Ash							100
					21		Sandry districts
Carbohydrates							
Carbohydrates and	l fat			1-74-			1:
Carbony drates and	140						tenses at law 2
Total digestible ma	atter						
Cost per ton	per 1	00 lbs	S		(KUF)	Si.	
Cost per lb. of dige							
General Remarks:	Ing.						

Exercis	se 40e.	NAME OF FE	ŒED	. 101. Heroita	er.
Fill out the	blank spa	ces below for	the feed giv	ven.	
Origin					
Guarantees: Per cen					
Purity Are whole weed seed					
If so, identify the m					
Value for feeding:					
Dairy Cows	Beef Cattle	Hors	es	Swine	' Sheep
	C	hemical Compos	sition, in Per C	Cent	
	1	Average	Digestion	Per Cent	Nutritive
-yaraye is the		Composition	Coefficients	Digestible Components	Ratio
Dry matter	0.000				
					Dry matter.
Protein					Protein
Fat	,				
Fatter				- Andread	
Fiber	, .				
AT 0				STORE THE	
N-free extract				He less	N-time notes
Ash					
					Server State of the server of
Carbohydrates		• • • •		F 19 18 3	starfireto Pall
Carbohydrates and	fat	8			1:
				Let from	detical poly
Total digestible mat	tter			- Washing a	tribeesin (etal)
Cost per ton	per 1	00 lbs			
Cost per lb. of diges					Cont last loss
General Remarks:					

Exercisi	E 40f. N	VAME OF FI	EED	44.74.7.4	
Fill out the bl	lank spac	es below for	r the feed gi	ven.	(Referen
Origin	Aller Anto		Terrifourcelle		
Guarantees: Per cent					
Purity					
Are whole weed seeds If so, identify the ma	The state of the latest of the			xious weeds in	
Value for feeding:					
Dairy Cows	Beef Cattle	Hor	ses	Swine	Sheep
	elanc free				
Marie policies de activista correlata	Che	emical Compos	cition, in Per C	ent	ms 2
	daran ur.	Average Composition	Digestion Coefficients	Per Cent Digestible Components	Nutritive Ratio
Dry matter					
	Section Che	Band Hard		E. and Level 2011	
Protein		Surreline feet		Section Sin W	Tella Tellaro
Fat	The law				
rat					
Fiber				pero sult som egai mate ba	
N-free extract					
Ash					
22011	Named No.	:			
Carbohydrates			mae v lee		
Carbohydrates and fa	t		••••		1:
Total digestible matte	er				
Cost per ton	per 10	0 lbs			
Cost per lb. of digestil	ble matter.				
General Remarks:	Mar. K				
				• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • •

EXERCISE 41. CONDIMENTAL STOCK FEEDS

(Reference, Productive Feeding, Chapter XX)

Secure a few samples of condimental stock feeds and try to identify some of their ingredients.

1. What kind of a filler do they contain? Estimate the proportion of stock feed made up by the filler.

2. Are charcoal, salt, sulphur, or any special drug or drugs to be distinguished?

3. Compare the cost of a pound of stock feed with the approximate cost of the filler and other ingredients thereof, in so far as these have been identified.

EXERCISE 42. THE FEED-UNIT SYSTEM

(Reference, Productive Feeding, Chapter IX)

- 1. A cow freshened December 12, 1913, and was milked until February 4, 1915. During this time she produced 18459.2 pounds milk containing 667.79 pounds butter fat, and consumed the following amounts of feed:
 - 5,385 pounds alfalfa hay.
 - 4,423 pounds corn silage.
 - 640 pounds mangels.
 - 7,111 pounds green alfalfa.
 - 1,760 pounds green barley.
 - 386 pounds green corn.
 - 1554.3 pounds wheat bran. . 1169.9 pounds rolled barley.
 - 927.8 pounds rolled oats.
 - 363.9 pounds linseed meal.
 - 455.7 pounds coconut meal.
 - 1420.4 pounds dried beet pulp.
 - Her average weight during this time was 1400 pounds.
- 2. Another cow in the same herd freshened February 6, 1914, and milked until January 21, 1915. During this time she produced 6058.9 pounds milk containing 213.55 pounds butter fat; her feed consumption was as follows:
 - 5091 pounds alfalfa hay.
 - 2228 pounds corn silage.
 - 9495 pounds green alfalfa.
 - 1369 pounds green barley.
 - 571 pounds bran.
 - 595 pounds rolled barley.
 - 373 pounds rolled oats.
 - 142 pounds linseed meal.
 - 222 pounds coconut oil meal
 - 153 pounds dried beet pulp.

Her average weight was 1450 pounds during this time.

Exercise 42 (Continued)

Figure out for each cow:

e contrate this holder and have the PEI indeeped I pare	1st cow	2nd cow
1. Cost of a gallon of milk		
2. Cost of a pound of fat at current feed prices	A SIMBOG	ASAL ASSA
3. Number of feed units eaten by each cow		121.4
4. Number of feed units per gallon of milk	pri afinimet	111.7
5. Number of feed units per pound of fat	en alumines	0,000
6. Number of feed units required for each cow, according to the	an epistoni	
feed-unit standard.	e diano.	1160
Tool and Soundard.	a spunist	120

containing 213.55 people butter far; ber helt consumming was as follows:

EXERCISE 43. COMPARISONS OF RELATIVE ECONOMY OF FEEDING STUFFS

(Reference, Productive Feeding, Chapter X)

Problem 1: Which is the more economical brand of linseed meal to buy, one guaranteed to contain 32.5 per cent protein and 8 per cent fat, costing \$36.50; or one containing 35 per cent protein, 6 per cent fat, costing \$40 per ton?

Problem 2: Which is the more economical brand of wheat bran to buy, one guaranteed to contain 16.5 per cent protein and 4.5 per cent fat, costing \$26 a ton, or one containing 13 per cent protein, 4 per cent fat, costing \$23 a ton.

Erables 31 Came molesses can be bought at 15c a gillon (12 posmils)

Exercise 43 (Continued)

Problem 3: Which is the cheaper feed:

- (a) Wheat at 80c a bushel or wheat bran at \$24 a ton?
- (b) Shelled corn at 60c a ton or hominy feed at \$28 a ton?
- (c) Sugar beets at \$5 a ton or dried beet pulp at \$25 a ton?
- (d) Clover hay at \$15 a ton, timothy hay at \$14 a ton, or alfalfa hay at \$18 a ton?

Problem 4: Cane molasses can be bought at 15c a gallon (12 pounds) and Indian corn at 60c a bushel (grinding 5c per cwt.); how much digestible matter is furnished for a dollar in either case?

EXERCISE 44. COMPARATIVE MANURIAL VALUES OF FEEDS

(Reference, Productive Feeding, Chapter XI, and Appendix Table V)

1. If a protein feed is needed to balance a ration, which one of the following feeds would be preferable, considering also manurial values: Wheat bran at \$24.50 a ton, dried distillers' grains at \$29.75, cottonseed meal at \$35, linseed meal at \$33, and tankage (60 per cent) at \$50?

Arrange the feeds in order of

- (a) Decreasing manurial values,
- (b) Cost of digestible protein,
- (c) Cost of total digestible matter.

Giving equal weight to (a) and (c), which would be the order of preference

(1) when dairy cows are fed, and (2) when pigs are fed?

Exercise 44 (Continued)

2. Calculate the manurial value in a ton each of the following feeds: wheat, wheat middlings, buckwheat middlings, cottonseed hulls, and red dog flour at the following prices: Nitrogen 20c a pound, phosphoric acid and potash each 5c a pound.

Arrange like feeds in order of (a). Decreasing manuful values, (b) Cost of digestible protein.
(c) Cost of total digestible matter

The a gallon (12 pounds)

3. Is it advisable from the view-point of soil fertility to feed Indian corn worth 90c a bushel, when gluten feed can be bought at \$25 a ton?

EXERCISE 45. A STUDY OF FARM FERTILITY

1. What are the fertilizing ingredients in the manure worth, from a herd of milch cows fed the following amounts of feed during a certain period:

540 lbs. oats 620 lbs. Indian corn 210 lbs. linseed meal (O. P.) 4040 lbs. corn silage 2320 lbs. red clover hay,

the cost of the fertilizer elements being: nitrogen 18c per pound, phosphoric acid $4\frac{1}{2}$ c, potash $5\frac{1}{2}$ c.

2. (a) How much fertility would be sold if these feeds (except linseed meal) were sold off the farm; (b) how much when the milk which was produced (1½ tons) was sold for direct consumption, and (c) how much, if only the butter made from this milk (testing 3.9 per cent) was sold, the skim milk and butter milk being fed on the farm?

(a).													•
b).				 									
c).													

B. RATIONS FOR FARM ANIMALS.

EXERCISE 46. PROBLEMS IN CALF RAISING
(Reference, Productive Feeding, Chapter XXI)

1. Make the best estimate you can of the amounts and cost of the feed consumed by a calf as raised by good dairymen in your section: (a) up to weaning; (b) to the end of the first year; (c) by a heifer during her first two years.

acid 415c potach 515c.

Exercise 46 (Continued)

2. Calculate the feed cost for raising a calf to weaning, at current market prices, according to the following methods: (a) leaving it with the dam; (b) feeding whole milk for 4 weeks, then gradually substituting skim milk and feeding hay and a grain mixture composed of oats, Indian corn (or milo maize), wheat middlings and linseed meal, two parts of the first three, and one part of linseed meal; (c) feeding whole milk for 2 weeks only and then as given under b.

EXERCISE 47. THE WOLFF-LEHMANN STANDARD FOR DAIRY COWS

(Reference, Productive Feeding, Chapters VIII and XXII)

What are the digestible nutrients and the nutritive ratios of the three rations given below:

		Dig	gestible	A LONG
to the design that it is the special period of	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
(a)				
30 lbs. alfalfa hay		-2		1:
(b)				
20 lbs. alfalfa hay			A TOUR	
30 lbs. corn silage				
(c)				1:
15 lbs. alfalfa hay				
25 lbs. corn silage				
5 lbs. barley				
				1:

Exercise 47 (Continued)

Give the amounts of dry matter and digestible nutrients that a cow weighing 1000 pounds and producing about 22 pounds of milk should receive in her daily ration, according to the Wolff-Lehmann Standard. Discuss in how far these requirements are met by the preceding three rations.

The Wolff-Lehmann Standard

		Dig		
militaria de la composición dela composición de la composición de la composición dela composición dela composición dela composición de la composición de la composición dela composición de la composición de la composición dela composició	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
1000 lb. milch cow producing 22 lbs. milk daily			Sand allel	1:
Differences between standard and co	mponents in pr	receding ration	ons:	
(a)		A CONTRACTOR	All tour feathers was	
(b)				1

EXERCISE 48. THE ARMSBY STANDARD FOR DAIRY COWS

(Same reference as for preceding Exercise)

What are the contents of digestible true protein and energy in the three rations given in the preceding exercise? (Use figures in Table III, Productive Feeding.)

wite-tio	Digestible Protein, Pounds	Energy Values, Therms
(a)		
30 lbs. alfalfa hay		
(b)	me 22 lbs	1000 lb tailor cow produc
20 lbs. alfalfa hay		benute measured secures/IRC
30 lbs. corn silage		CITAL MONON SECTIONS
(e)		10
15 lbs. alfalfa hay		
25 lbs. corn silage		
5 lbs. barley		

Exercise 48 (Continued)

Give amounts of digestible protein and energy called for by the Armsby Standard for dairy cows under similar conditions as suggested in Exercise 47.

Discuss in how far these requirements are met by the preceding three rations.

The Armsby Standard

differ consumer absence wealther of	Digestible Protein, Pounds	Energy Values, Therms
1000 lbs. milch cow	Line datus, cours,	
maintenance	extron that may seem d	
22 lbs. milk	THE RESERVE THE PROPERTY OF THE PERSON OF TH	TERRET TO JUSTICE SALE
Total		
Differences between standard and comp	onents in preceding three	rations.
(a)		
	ramoring	
(b)		
(c)		all the contribution
BANGE HEALT STORING		
		A STATE OF THE STA
		28 Car milk, 4 per cent.

EXERCISE 49. THE HAECKER STANDARD FOR DAIRY COWS

(Reference, Productive Feeding, Chapter XXII)

A 1200-pound cow producing 28 pounds of 4 per cent milk daily, receives the following daily ration:

20 pounds mixed clover and timothy hay, 34 pounds corn silage, 8 pounds of a mixture of corn meal, oats, dried distillers' grains (equal parts by weight) and one part each of linseed meal and gluten feed. How much total dry matter and digestible matter does the ration supply, and how does it compare with the Haecker Standard for dairy cows?

Suggest a modification that may seem desirable and show how it will affect the content of nutrients in the ration.

			. A PULL AND SELE	
A STATE OF THE PARTY OF THE PAR		Dige	stible	Dance To
But in a secondar and auto	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
20 lbs. mixed clover and timothy				
34 lbs. corn 'silage				
corn meal				
oats				
distillers' grains				
linseed meal				
gluten feed				
Total		1 1 1 1		1:
The Haecker Standard			1	
28 lbs. milk, 4 per cent				
Maintenance, 1200 lb. cow				
Difference				1:

EXERCISE 50. A STUDY OF RATIONS FOR DAIRY COWS

A herd of milch cows, weighing on the average about 1100 pounds, are each fed 10 pounds corn stover, 24 pounds corn silage, and 4 pounds corn meal per head daily, yielding on this feed with blue-grass pasture in summer, an average of 175 pounds of butter fat for the year. Suggest a change in the system of feeding which will bring the ration closer to the standard and increase the production of the cows. Calculate the cost per 100 pounds of milk and one pound butter fat, assuming that the herd milk tested 4.2 per cent for fat.

		Digestible		
	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
10 lbs. corn stover				
24 lbs. corn silage				
4 lbs. corn meal				1:
feeds for a dairy dow weighing	e following	di Siori no	tot in qui es	all S Ma
The Wolff-Lehmann Standard (es-	b) allim when	ne is a pon	iblaly bas	
timated daily production, lbs.	porn silugo,	Andqqua b	dimit) znd	
milk)		Colembar	1 (0, P.)	beenil
Ration as given above			Z rehem as	
Suggested (feed added,)lbs.				
				1:

Discuss variation from standard, and suggest further improvement in the composition of the ration.

2 Study carefully points to be observed in for initiating rations, in Productive Presing class of Chapter VIII, before writing this and similar exercises given in the Manual. In this table was range observed draw three similar to that need in Distriction for

EXERCISE 51, FORMULATING RATIONS FOR DAIRY COWS 1

1. Make up a ration from the following feeds for a dairy cow weighing 1150 pounds and yielding 25.4 pounds milk a day:

Corn silage, mixed clover and timothy hay, gluten feed and wheat bran.

Compare with feeding standards and calculate cost per day at current market prices and feed cost per 100 pounds of milk and per pound of butter fat, assuming the fat content of the milk to be 3. 8 per cent.

2. Make up a ration from the following feeds for a dairy cow weighing 925 pounds and yielding 16.3 pounds milk (4.9 per cent fat):

Clover hay (limited supply), corn silage, corn meal, wheat middlings and linseed meal (O. P.). Calculate cost of ration and average cost of milk and butter fat as under No. 1.

Secreted Used widood

¹ Study carefully points to be considered in formulating rations, in Productive Feeding, close of Chapter VIII, before writing this and similar exercises given in the Manual. In this and the following ration exercises draw forms similar to that used in Exercise 50.

Exercise 51 (Continued)

3. If mixed hay, corn stalks, ground oats and corn meal are available and represent the cheapest feeds on the market, what proportion of each had better be fed to a dairy herd; suggest an improvement in the ration by purchasing a small amount of some feed that will tend to balance the ration at a minimum cost, according to local market prices.

The Province of the analysis of the second s

EXERCISE 52. FORMULATING RATIONS FOR DAIRY COWS

1. Formulate a ration for the dairy herd made up of home-grown feeds only. Show how it may be modified by the purchase of a commercial feeding stuff; (a) with regard to nutritive effect only, (b) with regard to both cost and nutritive effect.

2. Five tons of alfalfa hay and 4 tons beets (mangels) make a sufficient amount of feed for a cow producing 300 pounds of butter fat in a year. Calculate the average daily ration, and compare with the Wolff-Lehmann and Armsby standards. Suggest a modification of the ration that you may consider will tend to increase its efficiency.

EXERCISE 53. FORMULATING RATIONS FOR DAIRY COWS

1. What improvement can you suggest in a ration for a dairy cow that is receiving alfalfa hay and wheat bran only? How much of these two feeds should a 1200-pound cow receive when yielding 23 pounds of milk (3.8 per cent fat)?

2. Make up a balanced ration for a dairy cow (weight 1150 pounds, producing 36.5 pounds of 3.5 per cent milk), from the following feeds:

(a) Clover hay and corn-and-cob meal.

(b) Corn fodder, corn meal, wheat bran and cottonseed meal.

(c) Pea-vine hay, cottonseed meal, cottonseed hulls.

(d) Alfalfa hay, corn silage, milo, barley

EXERCISE 54. FORMULATING RATIONS FOR DAIRY COWS

Formulate a balanced ration for a 1000-pound milch cow from the two feeds, oat straw and linseed meal, according to the Wolff-Lehmann Standard. Will this make an effective practical ration?—if not, give reasons why. Introduce one or two other feeds that will make up a desirable ration to feed good dairy cows.

our shinter that I Juneau very Prints a not nother described a on each only

Exercise 54 (Continued)

2. The following grain mixture is fed in a dairy herd: 200 pounds cornand-cob meal, 100 pounds each of wheat bran and ground oats, and 50 pounds linseed meal.

Calculate the digestible components, nutritive ratio and weight per quart of this mixture.

How many pounds should be fed with a good quality of mixed hay, when fed to cows producing 25 pounds of 3.6 per cent milk?

How much mixed hay, and how much hay and corn silage, should the cows receive with the grain mixture to make a balanced ration? What modification in the grain mixture would you recommend, if clover hay were the only available roughage?

Exercise 55. Formulating Rations for Dairy Cows

1. A cow consumed the following amounts of feed during one year: 1000 pounds of mixed hay, 100 pounds alfalfa hay, 6000 pounds corn silage, 600 pounds of soiling crops (green sorghum), 600 pounds each of wheat bran and corn meal, 80 pounds of linseed meal, and 365 pounds distillers' grains. She was on limited pasture 150 days. Her production for the year was 7180 pounds milk and 306 pounds butter fat; average body weight 1040 pounds.

Calculate total feed units eaten, estimating one pasture day equal to 8 feed units; also average feed units per day, feed units per 100 pounds milk and per pound butter fat.

Calculate cost of ration at average local feed prices; also feed cost per 100 pounds milk and per pound butter fat.

Exercise 55 (Continued)

2. A dairy herd producing, on the average, 6800 pounds of 4 per cent milk per head annually, receives the following feed during the year: mixed clover and timothy hay, Indian corn silage, corn stover, ground corn and oats, malt sprouts and linseed meal, in amounts that enable the cows to maintain a high production and keep in good body condition. Formulate a ration that will bring this about at a minimum feed cost, figuring the feeds at ordinary market prices, and including 150 pasture days, for which a charge of \$1.50 a month is made. Calculate the feed cost per quart of milk and per pound of butter fat, under the system of feeding recommended.

EXERCISE 56. CRITICISMS OF RATIONS FOR DAIRY COWS

- 1. What criticisms do you have to offer of the following rations for dairy cows:
 - (a) Corn silage 30 pounds, gluten meal 4 pounds, Indian corn 3 pounds.
 - (b) Wheat hay 20 pounds, flour middlings 5 pounds, wheat bran 3 pounds.
 - (c) Oat hay 20 pounds, oat shorts 8 pounds.

Calculate nutrients in these rations, and, if possible, look up Wisconsin Station Research Bulletin 17, and discuss the problem presented by them.

Exercise 56 (Continued)

- 2. Compare the following two rations for dairy cows as to digestible nutrients and feed cost, assuming that they have proved equally effective for milk production, producing 32 pounds of 4.5 per cent milk:
- (a) Fifteen pounds alfalfa hay, 5 pounds corn stalks, 40 pounds mangels, 4 pounds corn meal, 3 pounds ground oats.
- (b) Fifteen pounds alfalfa hay, 20 pounds silage, 3 pounds hominy feed, one pound each of linseed meal and dried distillers' grains.

What was the average feed cost per 100 pounds of milk and per pound of butter fat in either case at current feed prices?

10 nounds cover hex, 35 pounds sugar boots, 21 pounds of a grain mixture.

EXERCISE 57. RATIONS FOR DAIRY COWS ON OFFICIAL TESTS

1. The following daily ration is fed a high-producing cow weighing 1500 pounds: 40 pounds corn silage, 35 pounds alfalfa hay, 8 pounds barley, 7 pounds dried beet pulp, 4 pounds wheat bran.

Calculate the digestible nutrients in the ration and compare with standards. How much butter fat should a cow produce to be entitled to such a ration?

2. Make calculations as in the preceding ration with the following ration: 30 pounds Indian corn silage (from well-eared, nearly mature corn), 10 pounds clover hay, 35 pounds sugar beets, 21 pounds of a grain mixture consisting of bran, ground oats, gluten feed, equal parts by weight, and 3 pounds linseed meal.

EXERCISE 58. RELATIVE ECONOMY OF DAIRY FEEDS

(Reference, Productive Feeding, Chapter X)

1. Compare alfalfa hay and wheat bran as components of rations for dairy cows or beef cattle and give relative feeding value as indicated by (a) total digestible components, (b) energy values, (c) feed-unit system, and (d) results of actual comparative trials. At ordinary market prices, which one is the more economical of the two feeds?

Exercise 58 (Continued)

- 2. Calculate the relative economy of the following feeds at the market prices given, according to contents of total digestible matter, energy values and feed-unit system, viz.:
- (a) Alfalfa hay at \$18 a ton, corn meal at \$32 a ton, barley at \$28, wheat bran at \$24. Give order of preference for the purpose of making up rations for dairy cows.
- (b) Corn silage at \$3.50 a ton, alfalfa hay at \$15 a ton, timothy hay at \$18, and sugar beets at \$6 a ton.
- (c) Barley at \$25 a ton, Indian corn at \$32, wheat bran at \$24, wheat middlings at \$25.50, linseed meal at \$38, and cottonseed meal at \$36 a ton.

EXERCISE 59. RELATIVE ECONOMY OF DAIRY FEEDS

1. Compare the average yield of green feed, of total dry matter and of digestible nutrients obtained during the season in your state from an acre of (a) Indian corn, (b) alfalfa, (c) timothy hay and (d) mangels. Make the best estimate of the cost of production per acre and per ton of these crops that you can, and place the crops in their proper order of preference, according to your results, as to economy of production per ton of gross yields, total dry matter, and digestible nutrients.

Exercise 59 (Continued)

2. Which are the most economical feeds for supplementing alfalfa for dairy cows: Indian corn at \$1.80 per 100 pounds, barley \$1.25, wheat bran \$1.20, wheat middlings \$1.35 and corn silage at \$2.50 per ton? Give order of preference according to (a) content of total digestible matter, (b) energy values, and (c) feed units.

Give a practical ration selected from the preceding feeds for a 1200-lb. cow yielding 22 lbs. of 4 per cent milk, according to Wolff-Lehmann, Armsby, and the feed-unit system.

EXERCISE 60. A STUDY OF DAIRY HERD MANAGEMENT

1. A dairy herd consists of twelve milch cows, three of which are heifers with first calves. The daily production of the herd is as follows, that of the cows being given first, and that of the heifers last:

No	Milk per Day, Pounds	Per cent of Butter Fat	In Milk, Months
1	24.0	3.9	2
2	15.3	4.7	5
3	32.5	3.5	1
4	12.2	4.5	*7
5	18.7	3.7	6
6	10.3	3.2	4
7	25.0	3.6	2
8	8.6	4.1	8
9	14.2	3.8	3
10	5.7	4.6	6
11	12.3	4.5	5
12	7.6	3.3	9

Should any of these cows or heifers be disposed of as unprofitable? Place them in order of decreasing daily production of butter fat.

Exercise 60 (Continued)

2. Give a good method of feeding cows to be disposed of; also state the kinds and amounts of grain feed to be fed the individual cows when—(a) alfalfa, clover or cowpea hay is fed; (b) corn silage and corn stover are fed.

Should any of those dows or beilers be disposed of as unproduction of laster let

EXERCISE 61. FEEDING DIFFERENT-SIZED DAIRY HERDS

Outline a practical system of feeding:

- (a) A single-cow dairy.
- (b) A 25-cow dairy in your own locality.

Give total amounts of feed and cost at prevailing market prices in both cases, and calculate the returns from the dairies on basis of an average production of, respectively, 1.5 pounds and 0.7 pound of butter fat, valued at 30c a pound.

EXERCISE 62. SOILING CROPS FOR DAIRY COWS

(Reference, Productive Feeding, Chapter XII)

1. Suggest a succession of soiling crops adapted to conditions in your state, for a herd of 25 milch cows producing, on the average, a pound of butter fat a day, green feed to be provided from May 1 to October 15, in amounts of 30 to 60 pounds per head daily, according to the crops used. Estimate the yields and acreage of the different crops, and the dates between which they may be cut for green feed.

Calculate the amounts of hay (a small feed daily) and the kinds and amounts of concentrates to be fed in addition to the soiling crops during the period given.

Exercise 62 (Continued)

2. Calculate the approximate cost of growing, harvesting, and feeding the soiling crops given in (1) and, for the sake of comparison, estimate the amounts and cost of the corn silage that would be required to furnish equivalent amounts of feed materials for the period given, as in case of the green feed.

109

the viels of botter fut

EXERCISE 63. VALUE OF ALFALFA PASTURE

1. What is the carrying-capacity of a good 3-year-old alfalfa pasture for Alfalfa Alone Pasture with light Grain Feed.

	AND DESIGNATION OF STREET STREET	Million regions or state of the	agelula stol
(a)	dairy cows	in a series of the misself	
(b)) fattening steers		
(c)	sheep	•••••	
(d)) 3-months-old pigs		

2. How much alfalfa pasturage will be required to carry a herd of 32 dairy cows, yielding on the average 23.5 pounds of 4 per cent milk, from May 15 to October 1? The herd will receive, in addition to pasture, a light feed of hay from mixed grasses and an amount of grain feed equivalent to 7 times the yield of butter fat.

Exercise 63 (Continued)

- 3. Calculate the pounds of feed units consumed daily by the cows on this feed, estimating a pasture day at 12 feed units. Also the cost of the feed eaten, according to current market prices and with pasture at \$1.50 a month per head, butter fat being worth 32c a pound and skin milk 25 cents a hundred.
- 4. Calculate the returns obtained from an acre of alfalfa by the system of feeding outlined.

EXERCISE 64. COMPARISON OF FEEDS FOR FATTENING STEERS

(Reference, Productive Feeding, Chapter X)

What is the relative value of the following feeds for fattening steers, at the prices given, according to their contents of digestible nutrients and their energy and feed unit values:

Clover hay \$12 a ton, corn stalks \$4 a ton, alfalfa hay \$15, shelled corn 50 cents a bushel, oats 50 cents a bushel, and wheat bran \$25 a ton.

Comparison of Cost of Feeds

	Cost per	Digestibl	e Matter	er Energy Values		Feed Units	
	100 lbs.	Total	Per lb.	Therms	Per Therm	Total	Per Unit
1. Clover hay							Markemin T Market
2. Corn stalks							
3. Alfalfa hay							
4. Shelled corn							
5. Oats							
6. Wheat bran							

Order of preference:

According to digestible matter: Nos.

According to energy values: Nos.

According to feed units: Nos.

EXERCISE 65. RATIONS FOR FATTENING STEERS

Change each of the following three maintenance rations into a productive ration by the addition of one or more common concentrates:

- 1. Corn stalks 10 pounds, clover hay 5 pounds.
- 2. Clover hay 10 pounds, corn silage 15 pounds.
- 3. Alfalfa hay 8 pounds, corn stalks 6 pounds.

Reduce the roughage if need be, in order to make an effective ration.

_					
	LL EPAINGE MARKET	STATE OF THE STATE OF	Dige	stible	
	William)	Digestible Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
1.	***	- stated			
	10 lbs. corn stalks				Will the
	5 lbs. clover hay			umus l	subside facil ad
	lbs.			de de la companya de	a the Traves
2.				- F - (F)	e many - E
	10 lbs. clover hay	+		, yed	ation pulls
	15 lbs. corn silage			in in it	and alle
	lbs.			The second	
3.				- VAIC	
	8 lbs. alfalfa hay			irtshines n	
	6 lbs. corn stalks				
	lbs.				
	1			1	

EXERCISE 66. A STUDY OF RATIONS FOR FATTENING STEERS

(Reference, Productive Feeding, Chapter XXIII)

Calculate the nutrients and nutritive ratios in the two following rations for fattening steers. Which ration would be likely to produce the largest gains and which the cheapest gains at current prices for feeds?

- 1. 15 pounds shelled corn, 3 pounds linseed meal, 17 pounds corn silage, and 2 pounds alfalfa hay.
 - 2. 5 pounds linseed meal, 38 pounds corn silage, and 4 pounds alfalfa hay.

 Components of Rations

	E Hammel	Dige	stible	
	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
15 lbs. shelled corn			eyediniense	1000
			ing rank	
3 lbs. linseed meal				
17 lbs. corn silage				1.11
2 lbs. alfalfa hay				
			- 7 and serials	M(1) (1)
5 lbs. linseed meal		la propin	. realivirus	
38 lbs. corn silage				
4 lbs. alfalfa hay				
Wolff-Lehmann Standard for 1000			CALL SHAPE	
pound steers			office of	aelf à

EXERCISE 67. PROBLEMS IN STEER FEEDING

(Reference, Productive Feeding, Chapter XXIII)

1. A bunch of 25 steers averaging 850 pounds are bought at 7 cents a pound, and fed a ration composed of the following feeds for a period of 120 days: Corn silage, corn stover, ear corn, wheat bran, distillers' grains, linseed meal. In what proportions and amounts should these feeds be fed in order to have the steers gain 2 pounds a day or better?

At what price must they be sold to enable the owner to make 10 per cent on his investment, allowing a 3 per cent shrinkage?

EXERCISE 67 (Continued)

2. With feeders selling at 7 cents a pound, alfalfa at \$12 a ton, corn at 75 cents a bushel, barley at 60 cents a bushel, oat straw at \$6 a ton, and corn silage worth \$3 a ton, how much must fattening steers bring after a feeding period of 90 days, in order to return a fair profit to the owner?

EXERCISE 68. A STUDY OF RATIONS FOR HORSES

(Reference, Productive Feeding, Chapter XXIV)

What are the amounts of dry matter and digestible nutrients in the following rations, and how do these compare with the Wolff-Lehmann Standard for horses of 1200 pounds weight, doing medium work?

	1	Dies	stible 1	
	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
(a)	- O belimb			
10 lbs. alfalfa hay	ii iimini			
12 lbs. barley				
(b)				1:
10 lbs. alfalfa hay			i de la	
10 lbs. Indian corn				
(e)				1:
14 lbs. timothy hay				
12 lbs. oats				
Wolff-Lehmann Standard				1:
Difference				
(a)	6			
(b)				
(c)			515 8 3	

EXERCISE 69. A STUDY OF RATIONS FOR HORSES

- 1. Compare the following rations for a 1000-pound horse or mule doing heavy work, with the Wolff-Lehmann and the feed-unit standards:
- (a) Twelve pounds pea-vine hay, 6 pounds blackstrap (cane) molasses, 8 pounds corn-and-cob meal, 2 pounds cottonseed meal.
- (b) Ten pounds corn fodder, 5 pounds pea-vine hay, 10 pounds Indian corn, $1\frac{1}{2}$ pounds cottonseed meal.

Exercise 69 (Continued)

- 2. Calculate the nutrients in the following rations for farm horses of about 1200 pounds weight, doing moderate work, and discuss the rations with special reference to their nutritive ratios:
- (a) Eighteen pounds alfalfa hay, 5 pounds oats, 5 pounds barley, 2 pounds distillers' grains.
- (b) Fifteen pounds mixed clover and timothy hay, 10 pounds corn-and-cob meal, 5 pounds oats.
- (c) Fifteen pounds timothy hay, 5 pounds corn stover, 3 pounds each of oats and dried brewers' grains, 6 pounds wheat bran.

Suggest changes that will make them more effective without increasing the cost appreciably at local feed prices.

Dunbands vicenther and the transfer street street of

EXERCISE 70. A STUDY OF RATIONS FOR HORSES

1. Formulate a balanced ration for a 1200-pound horse doing medium work from the following feeds: Timothy hay, oats, dried brewers' grains, and coconut meal.

E THE STATE OF THE		Digestible		ALL VOLUME
- Indiana sa kanang di Skant ang	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
lbs. timothy hay	ming 5 , the		Server (ess	
lbs. oats	m meni m		V sough of the	
lbs. dried brewers' grains	T CONTRACT		il vidaisens	
lbs. coconut meal				

2. The following concentrates are fed to heavy-worked horses, weighing 1500 pounds: Oats 8 pounds, shelled corn 5 pounds, wheat bran 2 pounds per head daily. How many pounds of timothy hay are required to balance the ration according to the Kellner-Armsby Standard?

		Dig	estible	The state of
	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
8 lbs. oats				
5 lbs. corn				
2 lbs. wheat bran				
lbs. timothy hay				
Kellner-Armsby Standard				1:
Difference				

EXERCISE 71. A STUDY OF RATIONS FOR HORSES

Calculate the nutrients in the following rations for heavy-worked horses. Suggest an improvement in each ration by changes in the amounts of the feeds or addition of some other standard horse feed.

- 1. 10 pounds alfalfa hay, 15 pounds Indian corn.
- 2. 20 pounds timothy hay, 15 pounds oats.
- 3. 15 pounds alfalfa hay, 11 pounds oats, 2 pounds cottonseed meal.

Exercise 71 (Continued)

- 4. 9 pounds alfalfa hay, 15 pounds oats.
- 5. 8 pounds timothy hay, 7 pounds alfalfa hay, 15 pounds oats.
- 6. 15 pounds timothy hay, 10 pounds molasses, 5 pounds corn.

EXERCISE 72. RATIONS FOR COLTS, MARES AND WORK HORSES

Select from the common feeds in your locality, a good ration for: (a) horses doing heavy work, (b) idle horses, (c) brood mares, (d) growing colts, and (e) horses to be fattened.

Compare the rations with the Wolff-Lehmann and the Kellner-Armsby standards.

(a)

(b)

(c)

(d)

(e)

Exercise 72 (Continued)

Question 1. How does the character of the feed affect the amount of water drunk by the horses?

Question 2. Is corn silage a good feed for horses; if so, under what precautions and in what amounts should it be fed?

EXERCISE 73. A PROBLEM IN HORSE RAISING

Make a careful calculation of the amounts and cost of the grain and hay eaten by growing colts, and the length of the pasture period up to the end of (a) the first year, and (b) the second year.

EXERCISE 74. RATIONS FOR FATTENING PIGS

1. A bunch of pigs 4 months old are fed the following ration: 3 pounds corn meal, 1 pound wheat middlings, 10 pounds skim milk.

	Digestib		estible	
	Dry Matter, Pounds	Protein Pounds	Carbohydrates and Fat, Pounds	N. R.
3 lbs. corn meal				
1 lb. middlings				
10 lbs. skim milk				
Total				
Standard				

Is it a balanced ration?..... If not, what changes would you suggest?

2. Two-months old pigs are fed a slop of water and 6 parts corn meal, 3 parts middlings, and 1 part tankage. How does this ration compare in nutritive effect and cost with one composed of 1 part corn meal to 3 of skim milk at ordinary current market prices for feeds?

EXERCISE 75. RATIONS FOR FATTENING PIGS

(Reference, Productive Feeding, Chapter XXV)

1. Describe the method of raising pigs on your farm or on some farm with which you are acquainted, with special reference to the system of feeding practiced. If unable to do so, describe the method adopted by the Hog Department at your college or school.

2. Give ratio of skim milk to grain that will give the best results in pig feeding. What proportion is fed in case skim milk is scarce, and what proportion when an abundant supply is available? What can one afford to pay for skin milk when corn (grain) is worth \$32 a ton?

Exercise 76. Feeding Market Pigs1

The following rations are fed to fattening pigs: (a) 3 to 6 months old: 120 pounds corn meal, 25 pounds red dog flour, 10 pounds digester tankage; (b) 6 months to 1 year old: 100 pounds ear corn, 5 pounds digester tankage.

What is the nutritive ratio of these mixtures and how much are the pigs likely to clean up?

		Digest	ible	
	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
(a)				
120 lbs. corn meal				
25 lbs. red dog flour				
10 lbs. tankage				
Total				1:
(b)				
100 lbs. ear corn	The language		To other	
5 lbs. tankage		n lot a no	repaired but	7
Total	O thicken	nededoqu	milweini	
	H R SEE AR		orone)hun	1:

¹ New Jersey Report 34. 128

EXERCISE 77. A RATION FOR BROOD SOWS WITH LITTERS1

How much dry matter and total digestible nutrients does the following ration for brood sows with litters contain? How is it preferably fed and in about what amounts daily, per sow: 100 pounds corn meal (or its equivalent in ears), 10 pounds digester tankage, 15 pounds wheat bran, 5 pounds linseed meal, 2 pounds steamed bone meal.

EXERCISE 78. A PROBLEM IN PIG FEEDING

Describe a practical system of feeding a bunch of 50 2-months-old pigs through the summer and fall, on alfalfa pasture with concentrates, until they have reached a weight of 180 to 200 pounds.

How large a pasture will it take and what are the amounts and cost of concentrates required to get the pigs ready for market at 8 months old?

At ordinary market prices for concentrates, and with pork at 7 cents, what returns are obtained per acre of alfalfa by feeding the pigs in the manner suggested?

EXERCISE 79. A STUDY OF RATIONS FOR GROWING SHEEP

(Reference, Productive Feeding, Chapter XXVI)

Which of the following rations comes closest to the Armsby Standard for 9-months old sheep:

- 1. Three lbs. alfalfa hay, 3/4 pound Indian corn.
- 2. Two lbs. clover hay, ½ pound wheat bran, and ½ pound Indian corn.
- 3. One and one half pounds shredded corn stover, 1 pound gluten feed, 1/4 pound Indian corn.

What is the relation between the cost of the rations, at ordinary market prices, and the nutritive effects they are likely to have, judging by closeness to the feeding standard?

	Dry Matter, Pounds	Digestible Protein, Pounds	Energy Values, Therms
1. 3 lbs. alfalfa hay		Laure Too	
34 lb. Indian corn			NORTH STATE
2. 2 lbs. clover hay		a stoyangari	
½ lb. wheat bran			
½ lb. Indian corn			de digi
3. 1½ lbs. corn stover		openis union	
1 lb. gluten feed			
1/4 lb. corn			
The Armsby Standard			

EXERCISE 80. RATIONS FOR FATTENING LAMBS

Are any changes desirable in the following rations for 70-pound fattening lambs in order to bring them closer to the Wolff-Lehmann Standard?

- 1. One and one-half pounds clover hay, ½ pound Indian corn, ¼ pound dried beet pulp, and ¼ pound linseed meal.
- 2. One pound mixed hay, $\frac{1}{2}$ pound corn stover, $\frac{1}{2}$ pound oats, and $\frac{1}{2}$ pound wheat bran.

	1	Dige	stible	
the latter pulpers to encourage in	Dry Matter, Pounds	Protein, Pounds	Carbohydrates and Fat, Pounds	N. R.
. 1½ lbs. clover hay		*1	rebuse ha	leed edi
1/2 lb. eorn	•			
1/4 lb. dried beet pulp				
1/4 lb. linseed meal				
1 lb. mixed hay			and the same	.1:
1/2 lb. corn stover				
3/2 lb. oats				
1/2 lb. wheat bran				
Wolff-Lehmann Standard				1:
			日本の対象が	

EXERCISE S1. A STUDY OF POULTRY PERIODS

(Reference, Productive Feeding, Chapter XXVII)

Examine each sample of feed carefully and fill out the outline below.

Examination of Poultry Foods

Sample No.	Name	Grain or Mill Food	Color	Smoll	Thate	He and Phase He Grain, Consections it a Mril Food
1		The same of			ok rozenski	
2		STATE OF	1 18 per 11		and the test	a selbert
3		No her iff are to	e id in the con-	IN HE WAR	al region.	3 1000534
4		Ne State of	- Connectes	stated by		st and
5		NOW TEXTING	re relacion	158 15 15	0.00	100
6		Many to start			Des Trans	

Sample No.	Quality	Per cent Fiber, Low, Medium, High	Per cent Digestible Protein	Per cent Digestible Carbohydrates and Fat	N. R.	Price Per lb
1						
2				-		
3						
4						
5						
6						

¹ Exercises 81–82, contributed by Prof. J. E. Dougherty, Univ. of California, 183

EXERCISE 82. A STUDY OF POULTRY RATIONS

(Reference, Productive Feeding, Chapter XXVII)

1. Weigh out the feeds in the mixtures given below, mix them thoroughly and observe the following points: (a) bulk, (b) coarseness, (c) fiber content, (d) palatability, and (e) if ground feed, mix with water and note crumbliness or stickiness. Determine nutritive ratio of each and cost per pound.

Grain

15 lbs. wheat.

15 lbs. barley, whole or rolled.

5 lbs. corn, whole Egyptian or cracked Indian corn.

Mash

5 lbs. each of wheat bran, shorts or brown middlings, ground barley or oats.

2 lbs. soybean meal or linseed meal.

3 lbs. meat scraps.

1/2 lb. fine charcoal.

 $\frac{1}{10}$ lb. salt (1 lb. in 200 lbs. mash).

Exercise 82 (Continged)

- 1. The mash ration may be altered by reducing the amount of soybean meal or linseed meal one-half and adding a pound of alfalfa meal, or the alfalfa meal could be substituted for the ground barley. What would be the ratio and cost with this change?
- 2. In case wheat becomes too expensive to be fed economically, it might be reduced in the above ration by using equal parts by weight of wheat, Indian corn, barley and Egyptian corn (or milo).
- A still further reduction in wheat used would be secured by mixing equal parts of wheat, Indian corn, Egyptian corn or mile, barley and eats.
- 4. If it were necessary to entirely eliminate wheat, a mixture of equal parts of Indian corn, oats and Egyptian corn or milo might be fed in the morning with a feed of soaked barley (soaked for 24 hours) at night. A number of combinations quite similar in character could be used in periods of high prices.

What would be the nutritive ratio and cost of each in 2, 3, and 4? Note the difference in cost from the original mixture?

Digestion Coefficients of Common Feeding Stuffs, in Per Cent

(Various authorities)

Feeding Stuffs	Dry Matter	Protein	Fat	Fiber	N-free Extract
Green alfalfa Timothy hay Meadow hay Alfalfa hay Red clover hay	61 55 61 62 61	74 48 57 72 62	39 50 50 43 62	43 50 62 47 49	72 62 62 62 72 69
Indian corn fodder (cured)	66 57 48 66 87	45 36 33 51 70	70 67 36 82	63 64 54 65 37	73 59 46 71 95
Sugar beets. Corn meal Corn-and-cob meal Oats. Barley	88 79 70 86	72 66 52 77 70	91 84 89 89	34 45 31 50	97 92 88 77 92
Milo maize. Buckwheat feed ¹ . Grain screenings. Wheat bran. Wheat middlings, flour.	80 62 79 66 82	57 67 75 77 88	88 70 94 63 86	100 36 65 41 36	84 71 85 71 88
Wheat middlings, standard (shorts) Red dog flour Pea meal Gluten feed Brewers' grains, dried	87 87 87 87 62	77 88 83 85 80	88 36 55 82 90	30 26 76 50	78 88 ² 94 89 60
Distillers' grains, dried. Linseed meal (O. P.). Cottonseed meal. Cottonseed hulls. Coconut meal.	79 79 77 41 80	73 89 83 6 78	95 89 94 79 97	95 57 35 47 63	81 78 78 34 83
Beet pulp, plain dried. Beet pulp, molasses. Cane molasses (blackstrap). Skim milk Tankage.	77 83 78 98 92	51 62 32 95 97	00 187	72 80 	86 91 90 100

^{· 1} Calculated.

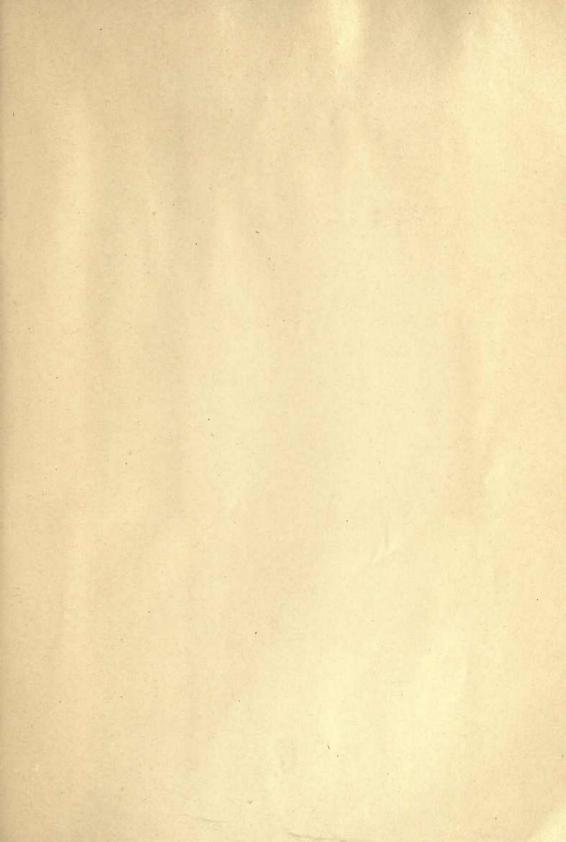
² Assumed.

SUGGESTED APPARATUS

1.	One analytical balance, capacity 200 grams to one milligram	\$15.00
2.	One set metric weights, 100 grams to one milligram	2.75
3.	One Barnes dissecting microscope	1.50
4.	One tripod magnifier	.70
5.	One gross 3 x 1 inch slides	.85
6.	One ounce No. 2 circular covers, 18 mm. diameter	.60
7.	One forcep, medium straight, 120 mm. long	.45
8.	Petri dishes, 4 inches, with covers	3.00
9.	One dropping bottle, one ounce	.20
10.	Two Griffin beakers, 100 c.c.	.48
11.	One scalpel, ½ inch	.25
12.	5½-inch brass sieves, one 50-inch mesh	.70
13.	One set of two sieves, 20- and 80-inch mesh, with cover and pan	1.50
		\$27.74

CONTRACTOR CONTRACTOR

NEW TOTAL STATE							
· Charles and the							
		0					



UNIVERSITY OF CALIFORNIA BRANCH OF THE COLLEGE OF AGRICULTURE

THIS BOOK IS DUE ON THE LAST DATE STAMPED BELOW

DEC 8 1933 5m-8,'26 37777.9 SF95 W59

UNIVERSITY OF CALIFORNIA LIBRARY

